

LEISURE THINGS *for Lively Youngsters*

T. J. S. ROWLAND, M.A.

illustrated by the author



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FOREWORD

In this series of books we first dealt with the marvels of plant and animal life, followed by a book about machines, engines and electricity. Then came "Vital Things for Lively Youngsters" which showed the wonders of the human body, the "Everyday Things for Lively Youngsters" wherein we read about the products of the earth and their uses

This new book will develop the natural desire to make things and to become skilful craftsmen.

Handicraft should play a prominent part in our lives. It certainly does in our earlier years, and there is no reason why it should not continue through life. From the day of our birth we begin to use our hands, first to hold, then to build, and finally to fashion and control. Some form of handicraft to co-ordinate both brain and body is excellent exercise for leisure hours

This is an age of wheels, engines, automatic machines and labour-saving appliances, and we should be very unwise people not to take full advantage of all the blessings these things bring. They afford us more leisure time, when we need exercises to keep the brain alert and the body fit

If we allow the art of making things by hand to disappear we shall lose an excellent means of self-expression. It is hoped that this book will be a stimulus to handicraft in order to keep the fingers nimble, the mind alert and the imagination active

The collection of tools in the average home is usually strictly limited. This has been borne in mind and the majority of things we shall make, call for no elaborate preparation or technical knowledge. Where tools are introduced the correct method of using them is explained. The pages on metalwork and woodwork should make an appeal to older children and a short account of desirable tools is given

Those who are skilful with their hands as well as the less skilled are catered for, and it is hoped that the book will be the means of creating lifetime interests that will enable all lively youngsters to spend many pleasant and instructive leisure hours.

T. J. S. R.

A LETTER TO ALL LIVELY YOUNGSTERS

BERKHAMSTED,

HERTS.

October 1940

DEAR YOUNGSTERS,

Greetings to all of you and thanks for the many letters of appreciation that you have sent me

Well, here is another book that should make a real appeal to you. We have always agreed that work should be a very pleasant thing and for that reason we have always endeavoured to get the maximum amount of fun out of our studies.

How often have you looked around for something to do? Most children want to make things, and their keenness to help their parents in the odd jobs about the house is pretty good proof of this.

A feature of this book is that you can open it at whatever page you like and find something to do. Another good thing is that the materials you require are cotton reels, bits of string, wool, paper, cardboard, empty tin cans and odd pieces of wood. They are all cheap and handy

Have you ever heard anyone say, "If only I had a carpenter's bench and a set of tools I could do some woodwork," or "If I had a lathe I could do metalwork"? These things are expensive and even if we could buy them it is doubtful if many of us would keep up our enthusiasm long enough to justify the expense. The majority of the things in this book can be made with ordinary household tools. But they will provide some skill at handwork with pleasant recreation and a useful training for hand, eye and brain.

A boy once said to his teacher, "Why should I learn to write nicely when I can use a typewriter?" What reply would you make to this poser?

Machines are wonderful but they were never invented in order that the remarkable dexterity of our fingers should be lost. There is something in us that admires and aspires to good craftsmanship. It was the craftsman that made the machine, and don't forget that it is from future craftsmen that all the new inventions will come.

A LETTER TO ALL LIVELY YOUNGSTERS

If you have read other books in this series you will know that you were chiefly concerned in gathering information and storing up knowledge in a very pleasing way. Now you are going to call upon your ability to create, and making things is great fun especially if you work intelligently. From the simple beginnings in this book other ideas may grow and some day you may produce an article new and beneficial to mankind.

Here is a final idea that may appeal to you. Several young friends of mine have painted the black and white sketches in the Lively Youngster Series. This book also lends itself to coloured illustrations. Why not paint them yourself and add to the pleasure the book will give when you show it to your friends.

May all the things you make in your leisure hours give you lots of fun and turn out a success every time.

Yours sincerely,

T. J. S. ROWLAND.

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FRENCH KNITTING

It is surprising the number of things you can do with cotton reels. Instead of throwing them away, just thread them on a piece of string where they will be ready to hand when wanted. An odd reel can be turned to useful account for making French knitting, rat-tail knitting or "Dolly down the reel," as it is frequently called. All that you need is mother's left-over oddments of wool, four half-inch nails and a piece of stiff wire (a hairpin answers the purpose admirably)

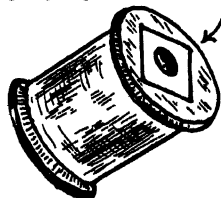
First, mark out a small square on one end of the cotton reel as shown in the sketch. Now carefully drive in a nail at each corner, leaving about a quarter of an inch sticking out. Use nails with small heads so that there is no difficulty in lifting the wool over the heads, but have a head sufficiently large to keep the wool from slipping off. (Shoemaker's brads are excellent for the purpose.)

Now take the end of your wool and push it through the hole in the reel. Hold the end of the wool and the reel in your left hand and loop the wool in turn over each of the nails, turning the reel from right to left as you do so. When you get back to the first nail, make no more loops but still continue winding the wool on the nails just above the loops. As you come in turn to each nail lift the loop below the wool over the head of the nail with your hairpin and drop it inside your square. After a few turns pull the knitting down the hole and so your dolly goes down the reel. When you have made a piece long enough for your requirements cast off in the following way. Break the wool a short distance from the finishing nail, lift the loop off each nail in turn and pass the end of the wool through it. Then pull tight. This prevents your work from coming unravelled.

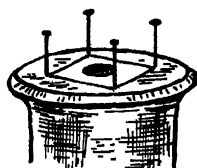
If you are artistically inclined you will select your wools to produce pleasing patterns. Now test your ingenuity and see how many useful articles you can make with your length of knitting. Boys will find that the knitting makes good reins for playing horses. Girls will turn their knitting into table mats by sewing it together. You can also make holders for lifting the kettle, tea cosies, mittens or small bags.

FRENCH KNITTING

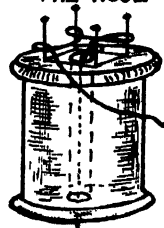
① MARK A SQUARE
ON END OF REEL



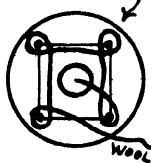
② DRIVE IN 4 NAILS
AT THE CORNERS



③ CASTING ON
THE WOOL

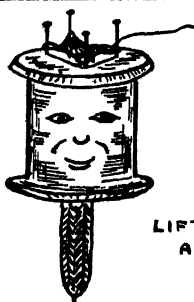


END VIEW



END OF WOOL

DOLLY DOWN THE REEL



④ HOW TO KNIT
WIND WOOL AROUND NAILS



SEW
A
SPIRAL

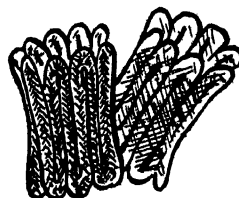


TABLE MAT

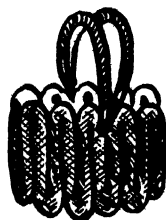
⑤ HOW TO CAST OFF



LIFT LOOPS OFF NAILS AND
PASS END OF WOOL THROUGH THEM

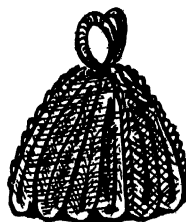
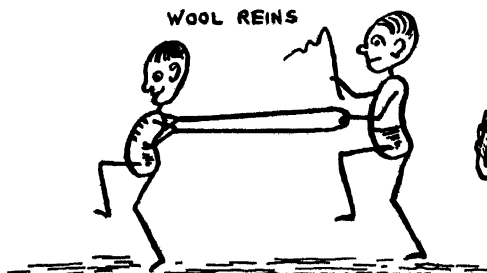


MITTENS



HAND BAG

WOOL REINS



TEA COSY

A MODEL TANK

HERE's a neat little toy that can be made with a cotton reel, a piece of candle, a drawing pin or tin-tack, a match stick and two small rubber bands.

Take your knife and cut off a half-inch piece of candle. Pull out the piece of wick and enlarge the hole through the candle with your knife until the rubber bands can be pulled through easily with a piece of wire (a hairpin will do). Now cut a small groove across one end of the candle just deep enough to hold a match stick. (*See sketch.*)

Next, drive the drawing pin or tin-tack into one end of the reel until the head nearly reaches the wood. We are now ready for assembling.

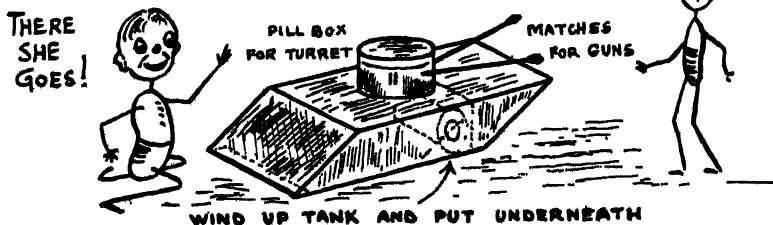
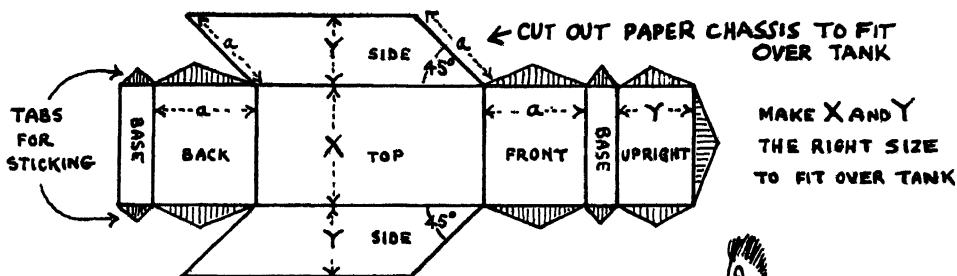
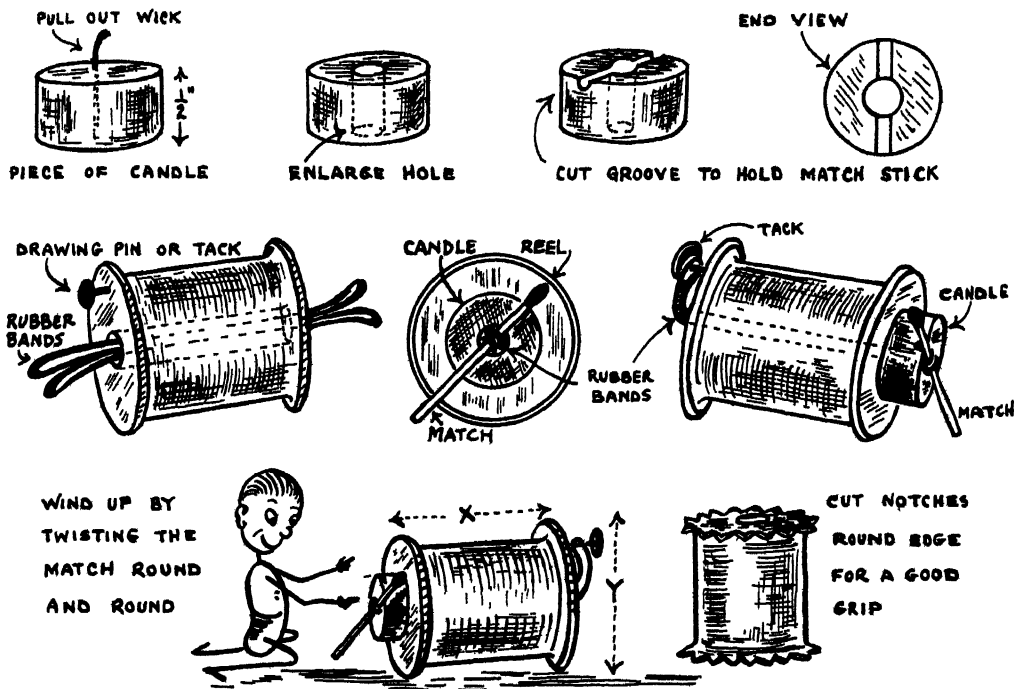
Thread the rubber bands through the candle with your piece of wire. Slip the match stick under them and drop it into position in the groove with one end of the match projecting beyond the candle. Now pull the free ends of the rubber bands through the cotton reel and anchor them over the drawing pin. Remove your wire and the very slightly stretched rubber bands will keep the candle against the end of the reel.

Hold the tank in one hand and wind it up by twisting the match round with your finger, just like winding up a clock. Place the reel on a table or the floor and as the rubber bands untwist the reel will be driven forward. If you like you can cut tiny V-shaped notches with your knife all round the rims of the reel and see if it moves better than the smooth rim.

The tank will be more realistic if you make a thin cardboard body to drop over your model. Draw on a piece of cartridge paper or thin cardboard a plan similar to the one shown in the sketch. Then you should have no difficulty in cutting, folding and sticking the body together. Notice that one surface is fixed upright inside the body so that the reel can press against it and carry the model forward.

Fix a small gun turret and a couple of guns on top and paint it over with grey paint. Make the width of the body so as to allow the candle and match to turn freely underneath it. You will be able to think of some way to make the turret yourself.

A MODEL TANK



SPINNING TOPS

COTTON reels can be used for making quite good spinning tops, either to twist with your fingers or to spin with a piece of string

To make the first kind of top mark a line round the middle of a cotton reel, and with a sharp penknife make a shallow vertical cut into the wood along this line. Now cut in from each side of the vertical cut, thus making a shallow V-cut all round. When your first V-cut is finished, the vertical cut can be deepened by putting the knife into the cut and rolling the reel backwards and forwards. The V-cut can now be made a little deeper. Repeat this process of making a vertical cut followed by paring the reel away until the two halves are separated.

Trim each half down to a cone shape (Fig. 4). Now point a wooden meat skewer and drive it through the hole in the middle. Cut the skewer about one inch above the top and round off the edge. The round point or spike of the top should be smoothed off nicely.

Now complete the second top in the same way.

To spin the top, hold the skewer between your fingers and thumb and give it a sharp twist. The top spins longer if, instead of pointing the skewer, you find a tiny round-headed nail for a spike. First cut the end of the skewer flush with the bottom and then you will have a flat surface into which you can drive the spike (Fig. 5).

To make a top which can be started with a string, select a big thread reel instead of a cotton reel. Cut this in the same way as before, but leave about half an inch of parallel reel before starting to point. This will provide a place to wind the string for starting the top. Finish the top as before. Now find a cotton reel with a hole in it larger than the wooden skewer (or shave down the skewer until it fits loosely in the hole). The top will then turn freely when the reel is fitted on to the top. (*See sketch.*)

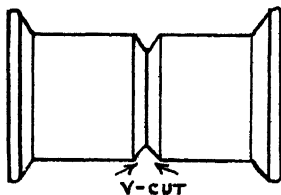
Now if the string is wound round the parallel part of the top whilst the loose reel is placed on the top and held together in the hand, you will be able to start the top spinning for a long time. Just give the string a sharp pull, and lift off the top reel. A little candle wax rubbed along the part of the skewer that fits into the loose reel will make it slip easily and work better.

SPINNING TOPS

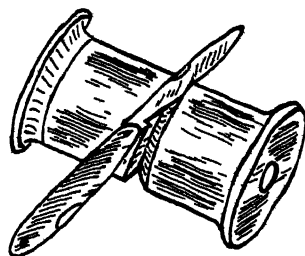
①
DRAW LINE ROUND MIDDLE
AND MAKE VERTICAL CUT
WITH PENKNIFE



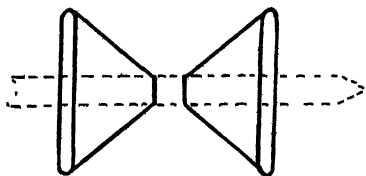
②
CUT IN FROM EACH SIDE



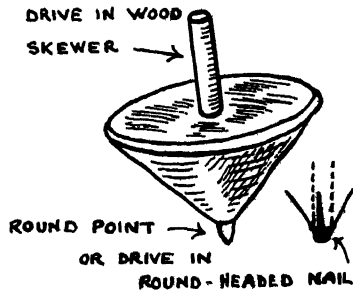
③
PUT KNIFE IN GROOVE AND
ROLL REEL BACKWARD AND
FORWARD, THEN MAKE
V-CUT DEEPER



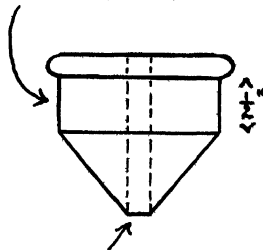
④
REPEAT PROCESS UNTIL
TWO HALVES SEPARATE



⑤
DRIVE IN WOOD
SKEWER

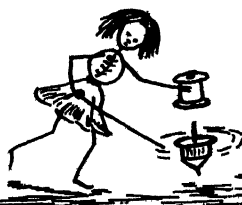


SPACE TO WIND STRING

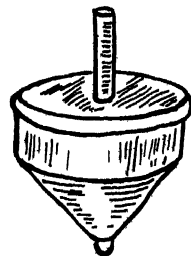


FIX WOOD SKEWER
OR DOWEL ROD

PULL STRING AND LIFT REEL AWAY



RUB CANDLE WAX ON END
THAT GOES INTO REEL



SIMPLE TOYS

HERE are some old-fashioned toys that you can easily make.

A Telephone. Get two small empty tins and punch a small hole in the centre of the bottom of each. Secure a long piece of thin string between them by knots inside the tins. When stretched out you can carry on a good conversation with a friend. The lids of the tins are not required

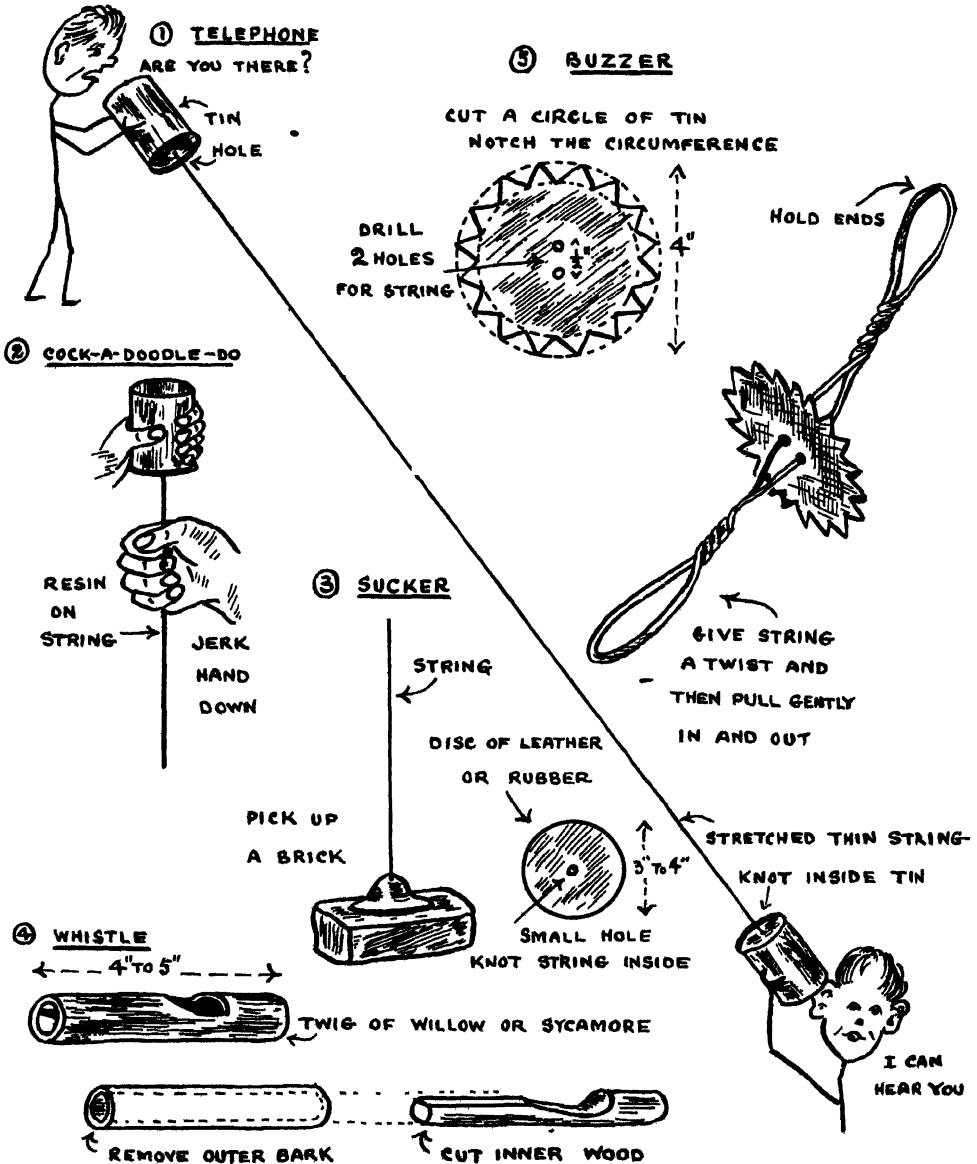
Cock-a-doodle-do is a noisy toy, so practise out of doors. Punch a hole in the bottom of a cocoa tin. Push a short length of strong string through the hole and secure inside with a knot. Rub some resin on the string. Hold the tin in one hand and grip the string with the other. Give a few sharp jerks without letting go and finish with a sharp pull. You can make it crow like a cockerel.

A Sucker. Cut a disc of stout leather or rubber from the inner tube of an old motor tyre. Pierce a hole in the centre. Tie a knot at one end of a piece of string and push it through the hole. Make the leather wet and push it down on a brick with your foot. When no air is between the sucker and the brick you can lift the brick with the sucker.

A Whistle. Cut a fresh stout twig of willow or sycamore as straight as possible. Remove the soft outer bark by gently tapping it all round. This will take some time, and comes off easier if you wet it occasionally. But keep on tapping until it slides off in one piece. Now take the hard inner wood and cut a deep groove at one end as shown in the sketch. Finally slice off a thin horizontal piece. Now put the inner wood back into the outer bark and cut the opening opposite the groove. It is ready to blow. If you put a tiny round pea in the groove before you put the pieces together the whistle will give a warbling note or "birl," as it is called in Scotland.

A Buzzer Cut out a circular piece of tin and notch the edges as shown. Next drill two small holes in the centre about half an inch apart. Now thread a long piece of string through the holes and tie the ends so that you have a loop on either side. Hold the end of a loop in each hand and give the tin a twist. Now pull gently in and out and as the string twists and untwists the tin will buzz round.

SIMPLE TOYS



PRESSING WILDFLOWERS

Collecting Box. You will require a flat tin box—an empty half-pound or one-pound biscuit tin will do—to keep your specimens moist until you get them home. Cut a nice spray from the plant showing stem leaves, flower buds and one or two open flowers. Lay it in the box carefully and when you get home revive it in water.

The press can be made with two pieces of wood seven to eight inches wide, ten to twelve inches long and half an inch thick. Two strong straps or tapes are needed to go round them. Next cut pieces of blotting paper a little smaller than the boards, also lots of pieces of newspaper the same size. Lay about six sheets of newspaper on the bottom board, then a sheet of blotting paper on top. Arrange your first specimen as naturally as possible on the blotting paper. Cover it with a sheet of blotting paper and then six sheets of newspaper. Proceed in the same way with the other specimens. Finally put on the top board and strap together firmly. Leave for a day, and then replace the damp sheets of blotting paper with dry ones daily, until the specimens are thoroughly dry.

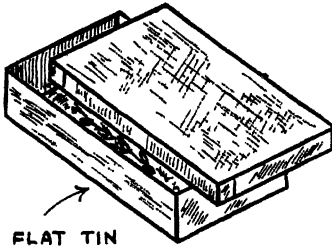
Mount your specimens on drawing paper or in a book, using strips of gummed paper or dabs of seccotine to hold them down. Below each specimen write the name of the plant and any points of interest. Big specimens may be dried in silver sand. Use a deep box and pour the sand very carefully around the plant, covering up the leaves and flowers in turn so that they do not bend out of their natural positions. When covered put the box in a warm dry place for a week or two. The dried plant will be stiff enough to stand in a vase.

Drying specimens in cotton wool is a method that partly flattens your plants. You require two wire cake trays, straps and cotton wool. Put a thick layer of wool on a tray, and arrange the plant nicely. Pack it with pieces of wool so that all the leaves are separated. Finally cover with a layer of wool, put on top tray and strap together, but not too tightly. Hang up in a warm place for a week or two until the specimen is dry enough to mount on a card.

Delicate seaweeds want careful handling, otherwise you lose the beauty of their shape. Bring them home in a pail of sea water. Pour the sea water into a flat dish and allow a specimen to float naturally in the water. Now slide a sheet of paper underneath the specimen, and lift the paper very slowly so that the water drains away, leaving the seaweed nicely spread out on the paper. Without disturbing it, transfer to your press and lay between blotting paper. When it is dry you will enjoy its beautiful lace-like pattern.

PRESSING WILD FLOWERS

COLLECTING BOX

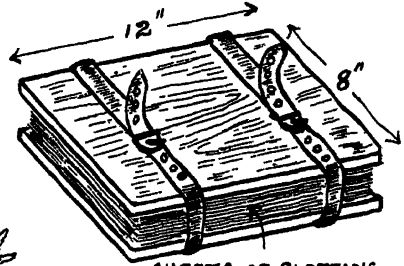


FLAT TIN
BISCUIT BOX

SEAWEEDS



FLOWER PRESS



SHEETS OF BLOTTING
AND NEWSPAPER

VIOLET



OAK

BEECH

PLANE



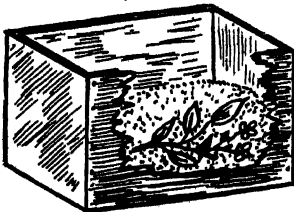
GOAT WILLOW

PRESSED LEAVES
MOUNTED

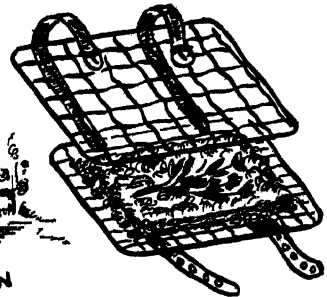
PRIMROSE



DEEP BOX FOR
DRYING SPECIMEN
IN SILVER SAND



WIRE TRAYS
AND COTTON WOOL



MAKE A COLLECTION



FREE PAPER CUTTING

AN amazing number of things can be done with odd pieces of paper and a pair of scissors. You have no doubt done some paper folding, and made paper Christmas decorations. But have you tried any free paper cutting.

First try to make simple designs for decorating models. You can also cut out flowers, or if you like build up quite effective pictures of country scenes, etc. With practice you will soon be able to cut out silhouette pictures of the members of your family in black paper. People at fair grounds do this and you admire the ease and dexterity of their fingers

To do the job properly you need coloured paper. You can get sheets of coloured paper already gummed on the back. They are known as appliqué papers but any sort of coloured paper will do, and you can apply gum or paste yourself to stick your designs into position.

On pages 50 and 66 you will see how to make models in cardboard and they look more effective if you decorate them with simple designs in coloured appliqué paper.

Now make a start. Get your scissors, paste, and any odd pieces of coloured paper. Use a nice stiff piece of brown paper, or a piece of carton paper either white or coloured for a background.

First put a nice design in a square. Draw your square on the brown paper or carton paper. Put in the diagonals to help you to lay out a well-balanced design.

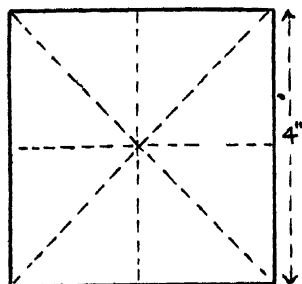
Now look at the sketches. The same shape piece of paper may be repeated four times. If you fold the paper into four, then one cutting will produce the four pieces all the same size and shape. When you have made the patterns we have chosen, look through some old newspapers or books for other ideas, and you should also think of a few original designs yourself.

We have suggested the suitable colours, but there is no reason why you should not make your own choice. Even if you are not good at blending colours you can experiment until you get a pleasing effect.

If you find difficulty in controlling the scissors, you should first draw the outline of the different shapes in pencil and then cut round them. These designs can also be done in brushwork, so that anyone who has a nice box of paints and is anxious to use them can get busy and do some painting for a change.

FREE PAPER CUTTING

SQUARE ON BROWN PAPER



DOTTED GUIDE LINES

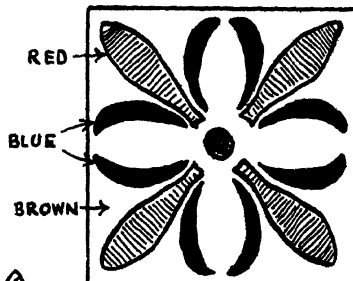
CUT FOUR AT A TIME



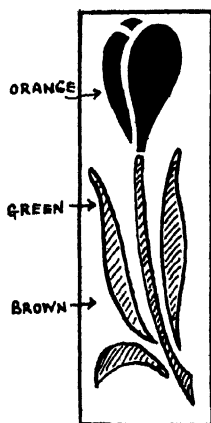
FOLD
INTO
FOUR



DESIGN FOR SQUARE

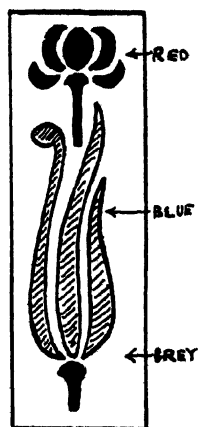
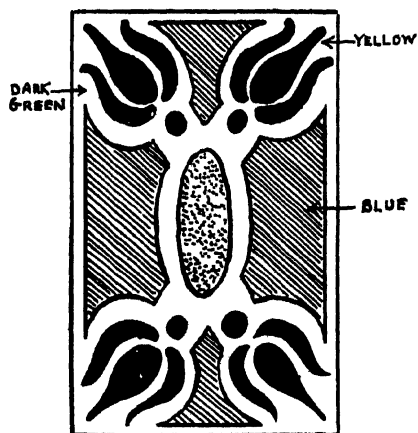


PASTE ON PIECES

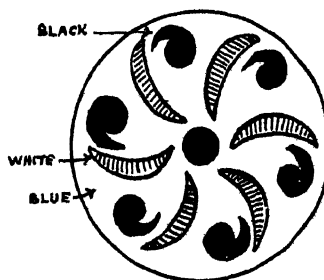
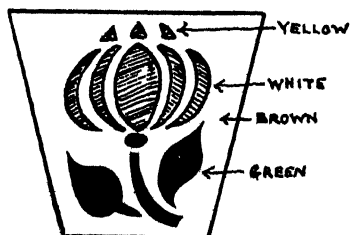


DESIGN FOR PANEL

DESIGN FOR OBLONG



DESIGN FOR PANEL



FLORAL PAPER CUTTING

PAPER CUTTING is great fun. It is not at all difficult to do, and the finished work in colours is very pleasing. Let us see if we can be equally successful in cutting out flowers.

Flowers that are very irregular in shape and complicated in structure might present too many obstacles and lead to disappointing results. We want to be pleased with our efforts, so we will start with flowers that are simple in shape. The Spring bulb flowers with their bright and showy colours are the best for our purpose. The leaves and the flowers are all simple in shape and easy to cut out. Daffodils, tulips, snowdrops, crocuses, bluebells all make excellent designs.

Try to get the flowers themselves and lay them in front of you while you cut them out. In this way you will get a better idea of their beauty, and learn quite a lot about their parts.

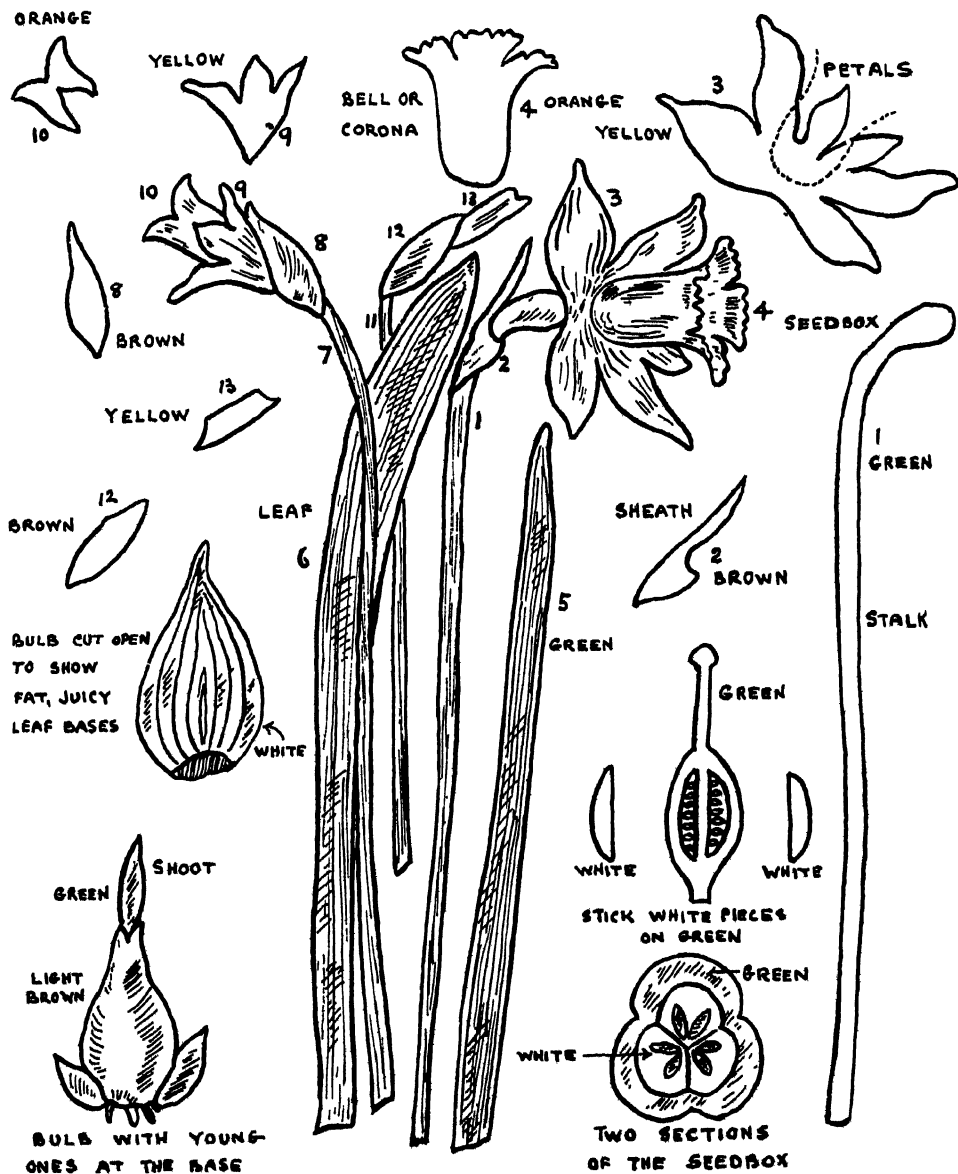
In cutting out the different parts try and arrange your pieces so that they just fit into one another. The work does not look so nice if you overlap or stick one piece of paper over another. It cannot always be avoided, but a perfectly flat piece of work looks best. Choose your coloured papers carefully so as to match as nearly as possible the real colours of the flowers. You will notice in the sketches that we have shaded some of the parts with lines. We call this the touching up for effect, and if you copy the method either with pencil or ink lines you will find that it puts the finishing touch on your work.

Start with the *Daffodil*. Whilst you are cutting out the pieces and fixing them in position, you will learn something about the flower. The separate coloured pieces of paper are shown and the numbers indicate the order in which you stick them in position. This flower looks very well if you paste it on a stiff piece of brown paper or card.

Notice that there are six petals, although the bell or corona covers up one of them. The seedbox is at the back of the flower and the sections below show that it is made up of three compartments with two rows of seeds in each. Cut one open for yourself and make sure. The papery sheath at the back of the flower protects the young bud. The leaves are green and sword-shaped and the veins are parallel.

If you examine a bulb you will probably notice that it buds off young ones at the base; and so bulbs multiply. Cut the bulb open. It looks something like an onion inside with rings of fat juicy leaf bases. Here is a store of food to give the flower an early start in the Spring of the year.

FLORAL PAPER CUTTING



DAFFODILS

SPRING FLOWERS

If you have followed the directions for cutting out the daffodil you will have no trouble in building up other flowers, for the method is just the same. There is no need for you to keep rigidly to the way in which they are set out in this book. You should use your own ideas. The work will look at its best when it stands out clearly. Dark backgrounds are helpful, and brown, grey, and even black suit the flower studies very well.

On the opposite page are sketches of four more flowers for you to cut out. It is only the outline of each piece that you must follow, so, whilst you are using the scissors, take no notice of the shading. When you have pasted every piece of coloured paper in position, take your pencil or pen and put on the finishing touches. As before, suitable colours are given against the parts of the flowers.

Apart from the pleasure that paper-cutting gives and the ease with which you become an expert with the scissors, it is one of the cheapest recreations, for in most cases the paper costs you nothing. In addition to this, the study of flowers is something worth while cultivating, and quite a lot of useful information is picked up while you are cutting them out. If you have a drawing book and are keen on painting you will find that these studies of spring flowers will be good practice for you. Those of you who are not good at drawing might use tracing paper to transfer them to your book, or if you like, just colour them in this book with paints or crayons.

Crocuses look very gay when planted in clumps under the trees. Some people like a border of them in the garden. They grow from round somewhat flat corms.

Very early in the New Year the delicate white *Snowdrops* come peeping out of the ground. They are the token of innocence and maidens all dressed in white used to carry them at a Church Festival known as Candlemas on the 2nd February.

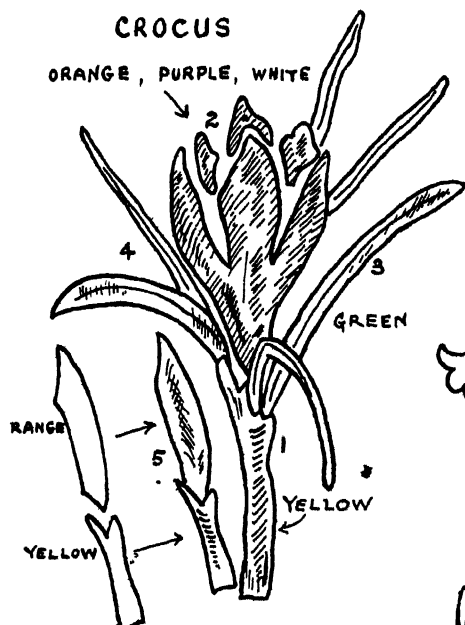
There is no need to say anything about *Bluebells*. One of the glories of Spring is the wonderful hazy blue of a bluebell wood with its strong heady perfume. Just a word of warning about picking them. Snap the stems above the ground, for if you pull them out of the ground you will kill the bulb.

Beds of tulips in the parks make a gay show. The Dutch have spent years in cultivating them, and there is now a fine array of gay colours. The pastel shades of the Darwinian tulips are very attractive.

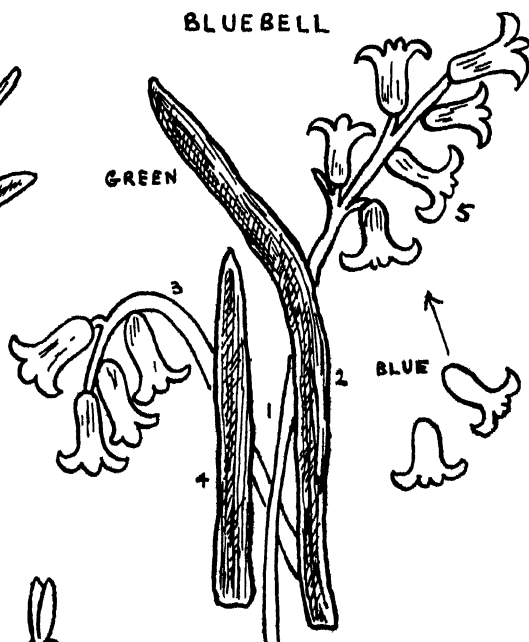
SPRING FLOWERS (IN PAPER)

CROCUS

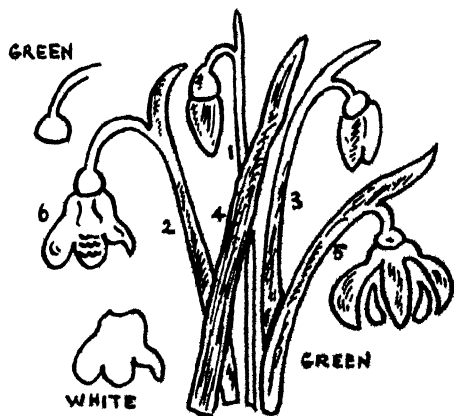
ORANGE, PURPLE, WHITE



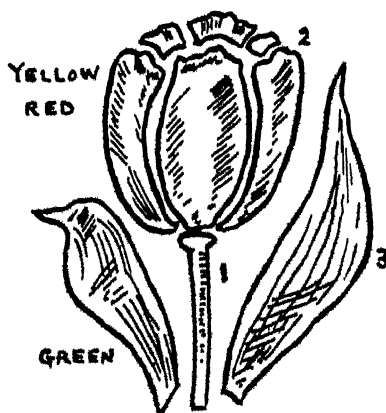
BLUEBELL



SNOWDROP



TULIP



PICTURES IN PAPER

HAVE you ever tried to cut out and build up a picture with pieces of coloured paper? It sounds difficult; but if you choose your subject carefully it is very interesting and quite easy to do. The picture looks real, too, when finished. We can only show you how to do it in black and white, but if you have a box of paints (or crayons), just put the right colours on the sketches on the opposite page and see what a transformation they make.

Having done that, you will be eager to take up the scissors and build up a picture for yourself. Choose a piece of stiff brown paper or art paper for a background and draw a framework on it five inches by three-and-a-half inches. Before you commence cutting out, study the sketch of Beachy Head carefully.

You will notice that it requires a strip of blue paper about one-and-a-half inches wide for the sea. Next a piece of white paper about two-and-a-half inches deep is wanted for the chalk cliffs, and finally a strip of green about three-quarters of an inch wide for the grass on top of the cliffs. Cut these out carefully and paste them in position. The ship and the seagulls can be cut out in white paper and fixed as shown—and there's your picture. It only needs a few black scratchy lines along the cliffs and on the grass to give that finishing touch which we have previously mentioned.

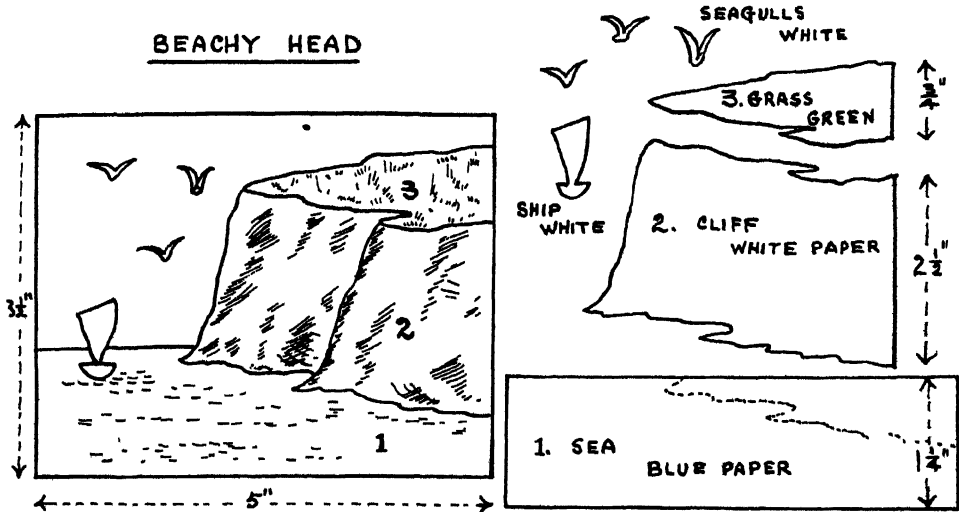
At the bottom of the opposite page are two more simple pictures for you to cut out. One is a scene in the far North showing Eskimos' dwellings, and the other is a country scene in Holland with a river winding through the flat country. They are both so simple that we think you can manage to cut out the parts and fit them together without further explanation.

First draw a framework on art paper just as you did for Beachy Head. When all the pieces are pasted and quite dry put in the shading.

From your geography, history or other books you will find other illustrations which you can build up with paper cut-outs.

PICTURES IN PAPER

BEACHY HEAD

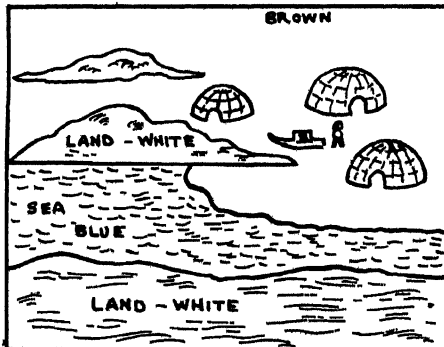


PASTE OR GUM ON A BROWN OR GREY BACKGROUND

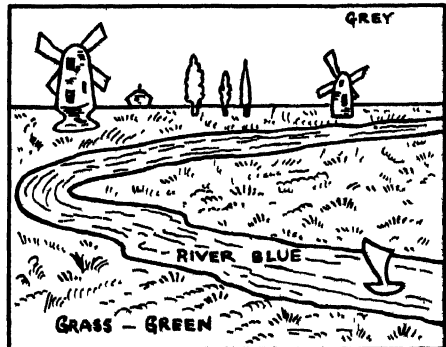
IN THE FAR NORTH ESKIMOS DWELLINGS



A COUNTRY SCENE IN HOLLAND



DWELLINGS AND SLEDGE
IN WHITE
ALL ON A BROWN BACKGROUND



WINDMILL AND SHIP
IN WHITE
ALL ON A GREY BACKGROUND

SCENES IN PAPER OR WOOL

If you search through illustrated papers or books you will find many a simple but delightful scene, either of the countryside or the sea, suggesting a picture that can be made with pieces of coloured paper.

Don't choose scenes in which there are lots of fiddling little pieces. Look out for bold masses with clear outlines that require fairly large pieces of paper. You can use transparent paper for tracing out the separate parts of the illustration. This will help you to get an accurate reproduction when the parts are put together.

Many of the advertisements in the daily papers, posters of shipping companies, pictures on railway stations and on hoardings are built up in this way. Keep your eyes open, and some day you may become a poster artist.

The illustrations on the opposite page are the kinds of pictures you will see again and again. Look at the first one, which represents a winter scene. We have taken this picture to pieces for you to show you how it may be built up, for at first glance you might say, "Oh, I can't manage that!" But you will agree that it is no effort at all to cut out four strips of paper (brown, white, black, blue) and paste them side by side in a frame, as shown in Sketch A. Next add the moon, clouds and houses as shown in Sketch B. Finally cut out and paste the trees in position and you will have completed the picture. Easy, isn't it?

Now just see if you have mastered the idea. Look at the bottom picture of a summer scene, with masses of flowers along the path; when you have taken it all in try and make a good picture yourself.

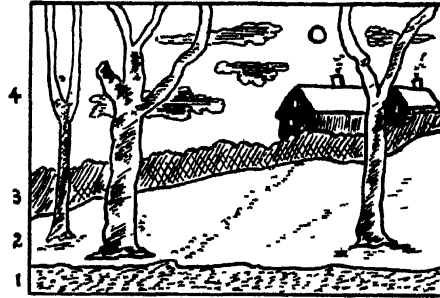
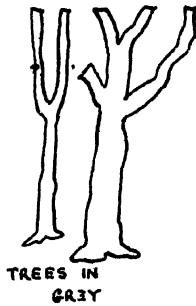
Scenes in wool. Here is another hobby which you can take up by way of a change. It provides another use for the odd pieces of wool that are left over from the knitting of socks, jumpers and scarves, for you work with coloured wools on a piece of canvas.

The sketch is first marked out clearly on the canvas, and then all the tiny square spaces on the canvas are filled in, using a needle and suitably coloured wools.

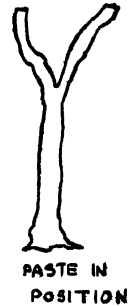
Art needlework shops supply the canvas and transfers, but perhaps you will find an odd piece of canvas somewhere about the house.

SCENES IN PAPER OR WOOL

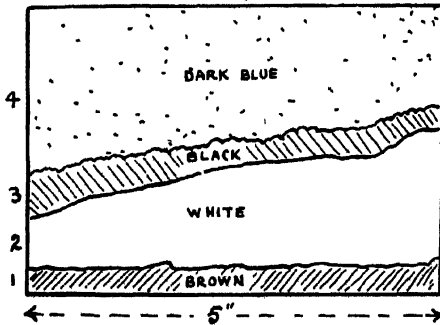
A WINTER SCENE



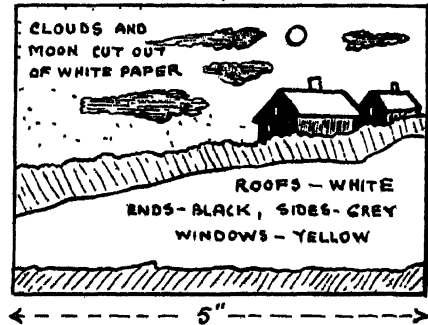
BLUE
BLACK
WHITE
BROWN



A



B



A SUMMER SCENE



CHOOSE YOUR COLOURS FOR THE FLOWER BEDS

MAKING A WINDMILL

First get a piece of stiff paper such as drawing paper, carton paper, or very thin cardboard. You will need too, a stick of wood, a strong pin or thin round nail and a small round bead with a hole in it big enough to thread on the pin or nail. Now get a black lead pencil, ruler, set-square and a pair of scissors and we will make a start.

Take a good look at the sketches, then follow the directions and you will make a good job of it first time.

Draw a square on your paper or cardboard, making each side seven inches long. The set-square will help you to get the corners quite square, and this is much easier than guessing at an angle of 90° .

Join the opposite corners of the square. These lines are called the diagonals.

Now measure three inches along each diagonal from the corners and mark the place with a tiny cross.

Mark five black dots with your pencil. One in the centre and four half an inch from each alternate corner. That is, mark one side of the corner and miss the other side.

Take the scissors and cut out the square. Then cut each diagonal from the corner to the cross. Next punch small holes through the five black dots with a pin or nail. Bend the corners with the dots one after another to the centre.

Push the pin or nail through all the holes and fix it to a stick of wood about 18 inches long.

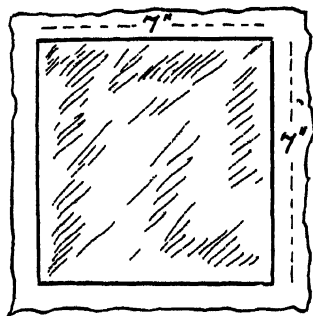
Have you guessed what the bead is for? If you put it on the pin at the back of the windmill just before you fix it in the stick it will keep the paper away from the wood and give greater freedom of movement. The bead is not absolutely necessary, but using it you will find that the slightest breeze will make the windmill whirl round in proper style. You can fix the pin either on the end or at the side of the stick.

Now that you have finished it, stretch your legs, and take a run with it down the street. You can also tie it up in the garden to scare the birds away, or fix it on your bicycle next time you go out for a spin. Lots of fun, anyway, no matter how you use it.

Now try making different size windmills.

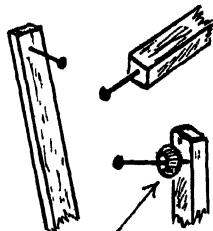
MAKING A WINDMILL

①



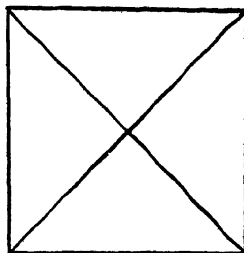
DRAW A SQUARE

PIN OR NAIL ON
SIDE OR END OF STICK



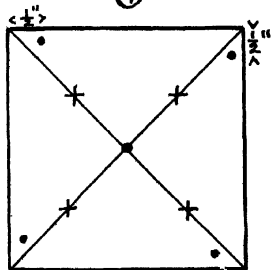
SMALL BEAD
TO KEEP WINDMILL
AWAY FROM STICK

②

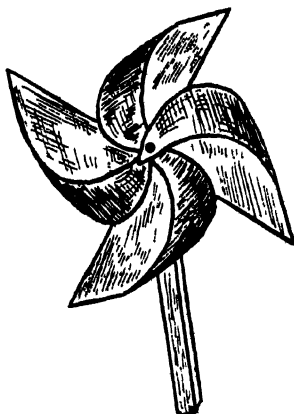


DIAGONALS

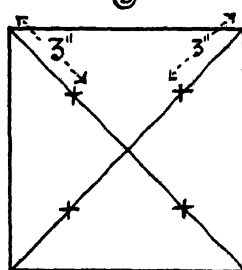
④



DOTS

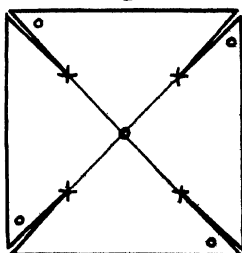


③



CROSSES

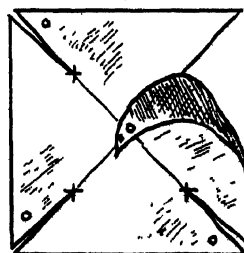
⑤



CUT OUT AND PUNCH HOLES



⑥



BEND CORNERS OVER

MAKING A STRING BAG

You can use up the odd string in the house and make a string bag.

First you want a netting needle. You can buy one in a fancy goods shop or make one out of a strip of hard wood. A piece of broken ruler about four or five inches long will do excellently. Cut the ruler down until it is about three-quarters of an inch wide and fork each end with your penknife as shown in the sketch.

Now you require a "mesh." This is a flat piece of wood such as a twelve-inch ruler or a piece of wood lath. Start by making a foundation loop with a separate piece of string about two feet long. Tie the ends together and slip the loop over a nail or the back of a chair.

Now tie the end of the string on your needle to the loop, hold the mesh in your left hand in a horizontal position. Wind the string once round the mesh by going over, round the back and through the loop to the front of the mesh. Pull the string until the mesh is up to the loop and about one inch from the starting point. Hold the string at "X" with your left hand whilst you make another loose loop with the string in front of your hand. Now pass the needle to the right, then round the back of the foundation loop and then pass through the cast or loose loop. Pull tightly against the finger that is holding the string to the mesh. This makes a knot. The sketches will help you.

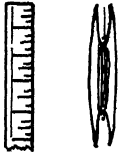
Follow on and make more loops in the same way. When about twelve to eighteen loops are made or cast on to the foundation loop pull out your mesh. Now turn your foundation loop completely over back to front. This will bring the needle from the right hand side back again to the left so that you are ready to begin the second row.

The second row is done in exactly the same way except that instead of using the foundation loop you now tie your knot to each of the small loops in turn, working along the row with your mesh below to form another row of loops. But don't forget to turn the work over the nail each time a row is completed.

When you have a sufficient length of netting for the bag, take the mesh out of the last row and cut off the string. Now take off the foundation loop. Next, fold the netting in half and sew up the open sides with string, joining up each adjacent pair of loops with a knot. For a draw-string at the top, thread a double string through the loops that form the mouth and finish off by knotting the ends together.

MAKING A STRING BAG

① NETTING NEEDLE

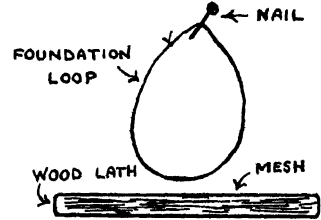


MADE OUT OF A PIECE
OF WOOD RULER

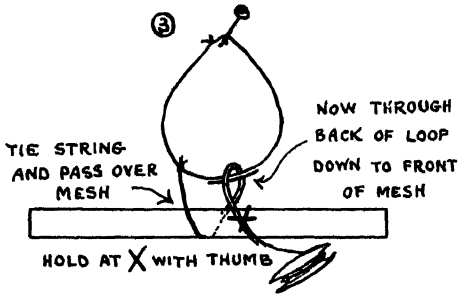
MENDING CRAB POTS



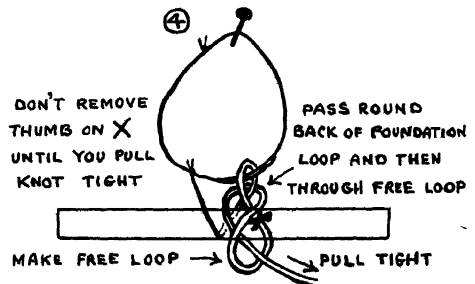
②



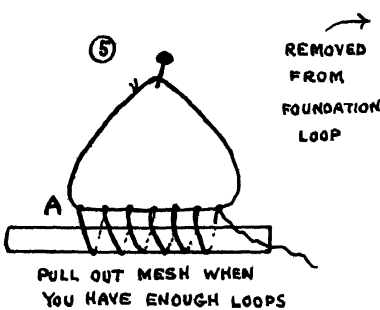
③



④

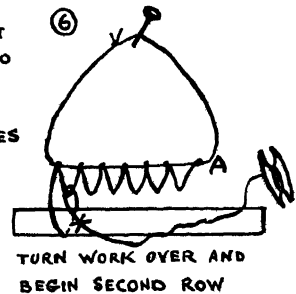


⑤

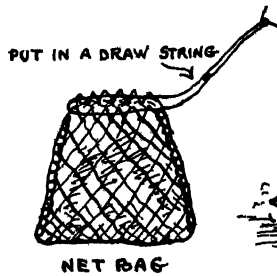


FOLD NET
INTO TWO
AND
SEW UP
THE SIDES

⑥



PLAY TENNIS



NET BAG



GO SHRIMPING

SERVIETTE RINGS— TABLE MATS

WINDING and weaving will provide a pleasant recreation. Odd pieces of cardboard are used for the frame or foundation of your work, and the working materials may be wool, silk, string, macrame twine or raffia.

Making Serviette Rings. Cardboard tubes about one-and-a-half to two inches high and two inches in diameter are suitable for your purpose. Many articles, such as biscuits and other goods, are packed in cardboard tubes. You should have no difficulty in finding a tube to cut up. If there are no tubes in the house just make them yourself by wrapping strips of cardboard round a rolling pin and gluing them down.

Bind your wool, raffia or whatever material you have chosen uniformly over and over the cardboard ring. New lengths can be glued down, but if you prefer to tie a knot see that it is turned inwards and covered over as the winding proceeds. If you are not satisfied with going round once, go round a second time and make a smooth job of it. Finish off by tacking the end of the wool well under the binding—a little glue will keep it fastened there.

It makes a better looking article if you decide to decorate it in different coloured materials. Thread the material on a strong needle and work some design around the side of the ring. Or you can work the initials of the various members of your family. You might also bind the edge of the ring to improve its appearance.

Table Mats. These may be bound in just the same way. You will find it best to stick to round or oval mats, because it is difficult to keep the wool or other material in position on a pointed corner.

Cut the cardboard as shown in the sketches, bind and decorate to suit your own taste. Draw circles with compasses for round mats and mats with semicircular ends. The sketch shows you how to make a good oval, with the aid of two pins, a loop of thread and a pencil. Stick the pins a short distance apart and place a loop of thread over them. Stretch the loop with an upright pencil and slowly draw the point of the pencil along the cardboard to complete an oval. Experiment with the pins at different distances apart, and vary the size of your loop of thread, until you have drawn the kind of oval you require for the mat.

SERVIETTE RINGS - TABLE MATS

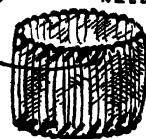
MAKING TUBES

USE STRIPS OF CARDBOARD AND ROLLING PIN

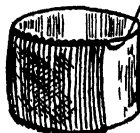
FOLD OVER
AND OVER



THREAD ON
NEEDLE



TUCK THE KNOTS
UNDERNEATH

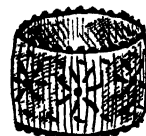


WORK A DESIGN
OR PATTERN

MAKE
DESIGNS



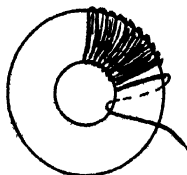
WORK
INITIALS



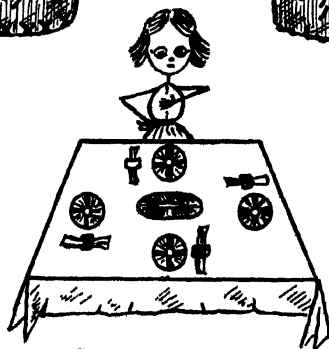
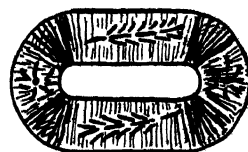
MY WORK



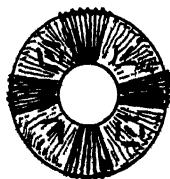
ROUND MAT



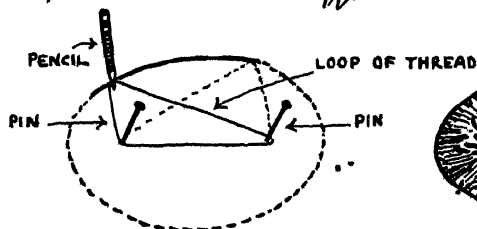
SEMI-CIRCULAR MAT



USE COLOURED RAFFIA



OVAL MAT



HOW TO DRAW AN OVAL

WEAVING A TABLE MAT

Now that we have made some interesting things by winding and feel quite pleased with the results of our work, let us turn to weaving. We will begin with table mats—round ones for plates and oval ones for dishes. Study the diagrams carefully.

First make the same cardboard foundations as previously used for winding, but this time you must cut a serrated edge round your cardboard. Mark off distances of about half an inch all round the outer curve and then make V-shaped cuts with scissors at these points.

It would be a good idea if you made the acquaintance of two words that are used by weavers, namely "warp" and "weft." The long threads that run the length of the material are known as the "warp." The threads that wind in and out of the warp form the "weft."

Now let us get back to the cardboard. Having made the V-cuts the next job is to thread the warp on it. String or macramé twine is best for this purpose. You require something strong for this foundation. Wind the twine over and over in the grooves.

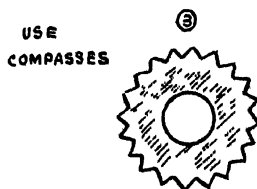
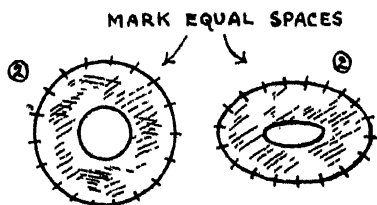
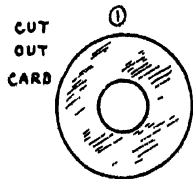
The weaving (weft) may be done with coloured wools or raffia and both sides of the cardboard are covered. You start on one side in the centre by tying the wool to one of the strings. Then thread your wool on a bodkin (or a hairpin) and begin threading the weft in and out, or if you prefer, first under and then over the warp. Try to keep it uniform and press the weft down from time to time. Fold all knots underneath so that they do not show on the finished work. By changing your colours from time to time you can work a pleasing pattern. Do both sides in exactly the same way so that the foundation cardboard remains permanently inside the mat.

When you have finished weaving, the points of the cardboard are still showing, and these need finishing neatly. The quickest method is to round them off with scissors, and you may like to give them a coat of paint. A touch of gold or aluminium paint makes an excellent finish. Your mother or any of your friends will be very willing to accept them for a present, or you might make some for a Sale of Work.

Why not make a complete set for household use?

WEAVING A TABLE MAT

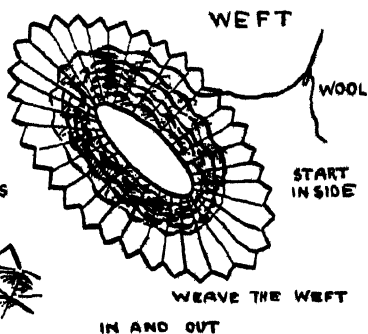
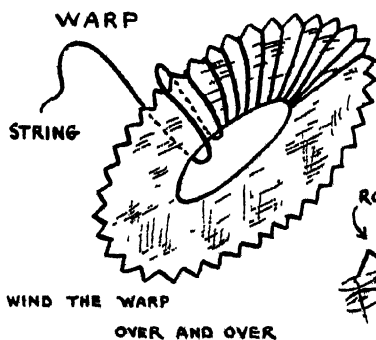
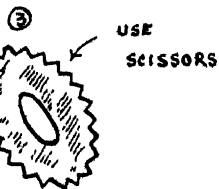
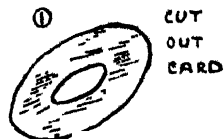
ROUND MATS



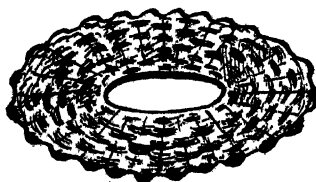
MAKE V-CUTS ALL ROUND



OVAL MATS



FOR OLD



FINISHED



AND YOUNG

HANDBAG AND TEA COSY

Have a good look at the sketch and then draw the shape of the bag on cardboard. You can vary the shape a little, but the one that we have drawn has proved to be most successful. Now make the holes around the bottom of the bag with some pointed instrument such as a compass-point. The holes should be equally spaced and about half an inch apart, and there should be an odd number of them (21 in diagram).

Next fix two curtain rings securely, one on each side of the cardboard, but sew them only at the top.

We are now ready to thread the warp. Use good strong string for this purpose. Commence by tying the string to one of the rings, then push it through the first hole and up through the ring on the other side of the card. Now bring it down through the second hole to the front again. Continue up through the front ring, down through the third hole to the back, and so on, until all holes are threaded and the string tied at the finishing point.

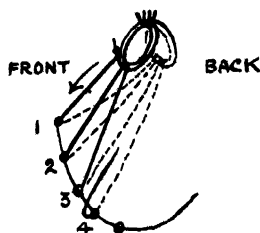
Begin weaving at the top near the ring and work downwards. When one side is completed, turn the cardboard round and do the other side in the same way. Finally, break all the cardboard away and the bag is complete except for a few trimmings. Use strong string for the handle, and finish it with tassels. A large tassel for the bottom with a string of fancy beads sewn along the edge make a good addition. Show your artistic talents in making the final touches with fancy work. We worked a small bag in fancy silk thread and lined it with a piece of pink silk. All the ladies admired it, and the lucky owner was very proud to carry in it her purse, pocket handkerchief, powder puff, etc.

A Tea Cosy. If you look at the sketches you will see that a tea cosy is like a handbag turned upside down. The size you make will depend, of course, upon the teapot it is going to cover. Instead of punching holes you could cut the correct shape with a serrated edge, but the holes are more secure. Start as before at the semi-circle and work the weft in nice thick wool. When finished break away the cardboard, also the small bone curtain rings which are no longer required, and line the inside with warm material. You might cross-stitch in coloured wool around the edge, and work a suitable design on the sides.

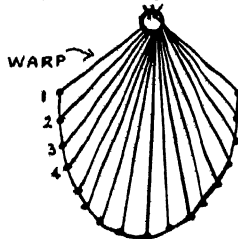
Here is a tip worth remembering. It is rather difficult to get the weft under the strings (warp) when starting at the rings. Therefore weave *away* from the semi-circle, and push the weft down into position after you have got it threaded.

HANDBAG ~ TEA COSY

THREADING THE WARP



READY FOR WEAVING

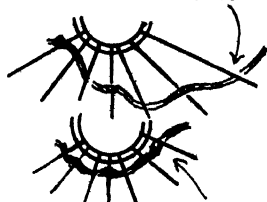


STITCH AT TOP ONLY

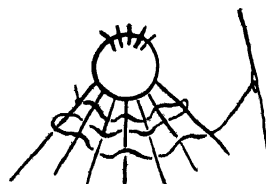
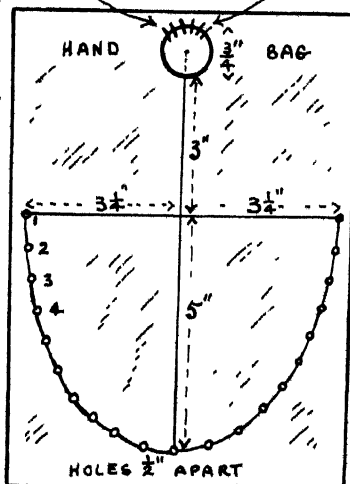
CURTAIN RINGS

FRONT AND BACK

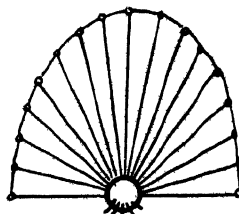
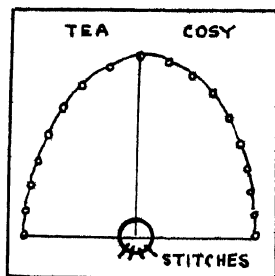
WEAVE AWAY FROM RING



THEN PUSH UP INTO POSITION



BEGIN WEAVING AT THE RING



READY FOR WEAVING



SLIPPERS—TAM O'SHANTER

Slippers. You can make a nice warm pair of bedroom slippers. First buy a pair of fleecy-lined soles at some fancy shop and then weave the uppers to fit them.

Begin to work in this way. Mark out on thin cardboard two patterns similar to the one shown in the sketch. Cut out a pattern in paper first and pin it round the sole to make sure it is the right size. Then try it on your foot and trim it to the right depth. When you are sure you have a good fitting, unpin the pattern, lay it flat on the cardboard and mark round it.

Punch small holes as shown, along the lines of the pattern about half an inch apart and also have a large hole where shown in the sketch. Then thread the warp with string exactly as shown.

Begin weaving, starting along the inside of the pattern with nice warm wool. When finished, remove the cardboard, line the inside of the slipper and sew it in place on the sole, beginning at the toe. Fancy bows, strings for tying, or elastic bands can be added.

Tam o'Shanter. On one side of a piece of cardboard draw a circle the size required for the tammy top. Punch holes all round the circumference about one inch apart and then fix a small curtain ring in the centre by oversewing rather loosely with thread. On the other side of the cardboard draw a smaller circle to fit your head. Punch the same number of holes around the edge of this circle as in the larger one, but they will be nearer together as the circumference is smaller.

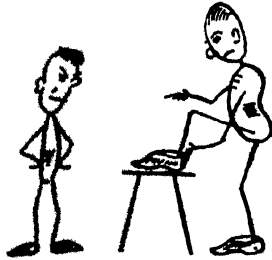
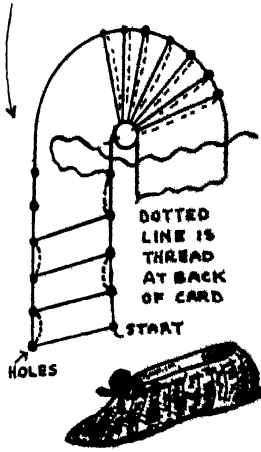
Now look at the sketch and thread the warp with strong string in the manner shown. Start by fixing the string to the ring, then pass it through a hole in the outer circle to the back and bring it through the corresponding hole in the smaller circle to the front again. Now be careful and pass through the next hole on the inner circle to the back. The thread now goes through a hole in the outer circle to the front, then down through the middle ring and up again through the next outer hole to the back. Follow right round the card in the same way, as shown.

When you have formed the warp all round, finish it off strongly and begin to weave in wool as before, starting from the centre ring. Finish off the top of the tammy by tying wool to a strong warp. Then weave the underside, beginning at the headband. When both sides are completed, remove all the cardboard. You will only need a tassel to turn you into a real Scottie,

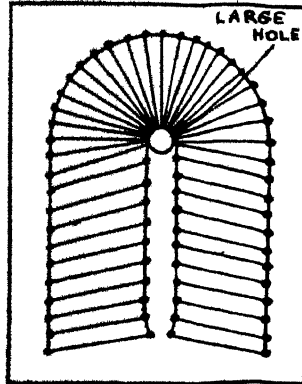
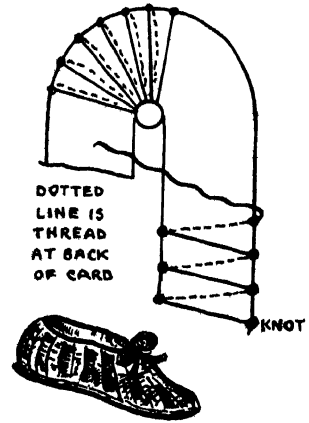
BEDROOM SLIPPERS - TAM O' SHANTER

MAKE A GOOD FIT

ONE METHOD
OF THREADING WARP

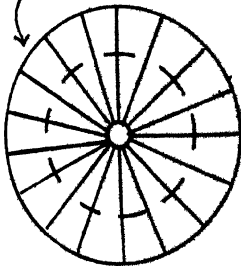


ANOTHER WAY
OF THREADING WARP

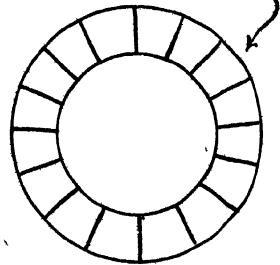


PATTERN FOR UPPERS
BEDROOM SLIPPERS

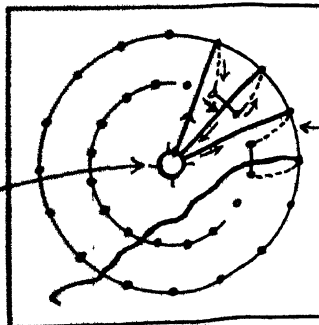
FRONT WARP



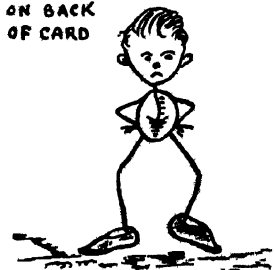
BACK WARP



CURTAIN
RING
SEWN
AT
CENTRE



TOP OF
TAM O' SHANTER



A CANDLESTICK

VERY artistic candlesticks can be made by first fixing cotton reels one above the other and then screwing the bottom one to a suitable base. If you choose the reels carefully quite a variety of patterns may be built up.

Clean the ends of the reels with glass-paper until quite smooth. Now give them a thin coat of glue and clamp them together. You will find that they hold quite firmly if left for a few hours. Another good method of holding them together is to trim down a wooden meat skewer until it fits tightly into the holes in the reels. Drive the reels along the skewer by tapping them with a hammer until you have the height of candlestick you require. Now saw off the end of the skewer flush with the reels. For the base you might select a round wooden disc, or a hexagonal one, or some saucer-shaped article that is just the thing for your purpose.

Making a Base. Perhaps you would like to make your own base. This is the way to make a hexagonal one.

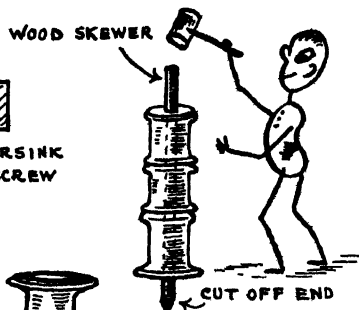
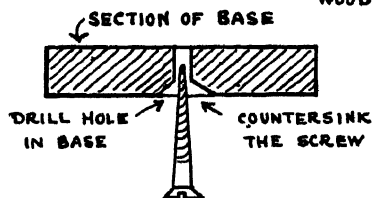
Find a piece of wood about six inches square and three-quarters of an inch thick. Plane it to make the surfaces smooth. Then with a pair of compasses draw a circle of two-and-a-half inches radius. Now, keeping the compasses set to two-and-a-half inches, step the radius round the circle, being careful to start at A or B (since the grain should run from A to B). Join up the points and you will have a regular hexagon. Now saw off the surplus wood just outside the lines of the hexagon and finish off with a plane, being careful to plane with the grain. (*See arrows in sketch.*) To make the base look better, chamfer the top edges, that is, plane off the corners. Be careful to plane with the grain as before.

Having made or selected your base, drill a hole through the centre with a gimlet or drill and countersink (or cut away) the edge of the hole so that the screw that goes through will be well sunk in the wood. Now drill a hole up the bottom reel, choose a suitable screw and fix the base in position.

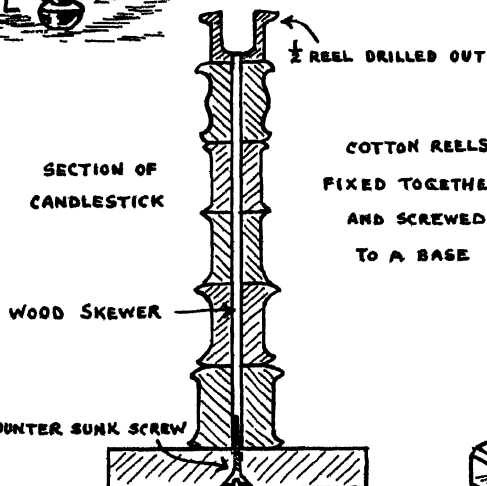
You can overcome the difficulty of the holder for the candle in several ways if you put on your thinking cap. Of course, you might burn out a hole in the top reel, which forms the holder, with a red-hot poker and clean it up to the right size with your penknife. A better way is to use a brace and a twist bit to bore the hole. First plug the hole through the holder reel with a piece of wood. Then fix the reel securely in a vice.

A CANDLESTICK

GLUE THEM TOGETHER

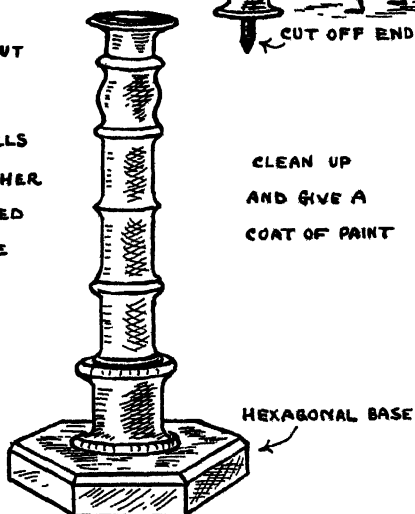


SECTION OF
CANDLESTICK

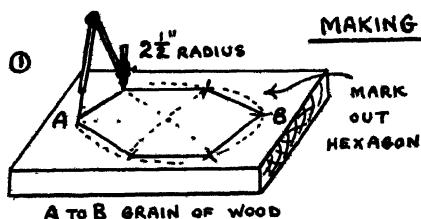


COTTON REELS
FIXED TOGETHER
AND SCREWED
TO A BASE

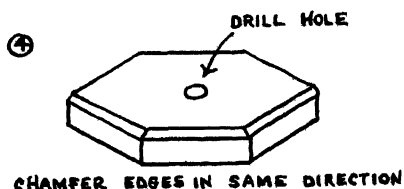
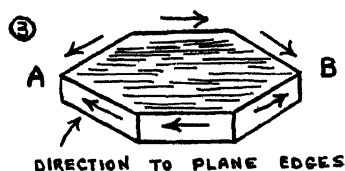
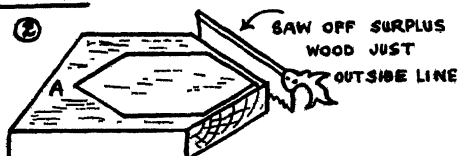
CLEAN UP
AND GIVE A
COAT OF PAINT



MAKING A BASE



A TO B GRAIN OF WOOD



A TINPLATE SOCKET

A CANDLESTICK (*continued*).

Now centre your bit and bore out the hole slowly to the depth of about one inch. The diameter of the hole should be about three-quarters of an inch.

Another idea is to saw a reel in half and bore the candle-hole right through one half. This looks well when glued on to the top reel.

Any other wooden object with a deep well in it might prove to be just what you want if the diameter of the hole is correct for the candle. Just look around the house for suitable material. Look yourself, don't worry other people to find things for you. When you have collected all you want for the job, prepare the holder, the stand and the base separately, and finally assemble them. Rub the candlestick down with glass-paper and give it a nice coat of cellulose paint.

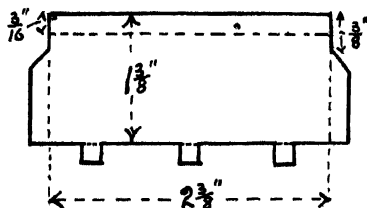
TO MAKE A TIN SOCKET.

If you think there is a risk of the candle burning down and setting fire to the wood, you should try your hand at making a tin socket for the candle. The sketches show you how this may be done. If you look up pages 102 to 108 you will find a full account of the method for doing metal work and soldering.

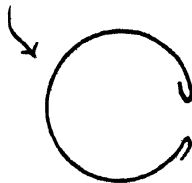
Get a piece of tin about four inches long and two inches wide. Mark out on it the plan of the socket with a blacklead pencil. Cut out the shape with an old pair of scissors and fold it according to the directions. Now cut a round tin base to fit on the cotton reel and solder the socket to the base. Finally screw the base on the reel as shown.

MAKING A TINPLATE SOCKET

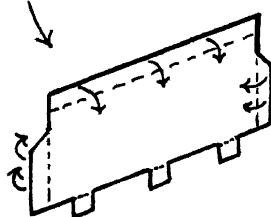
- ① CUT PIECE OF TIN THIS SHAPE



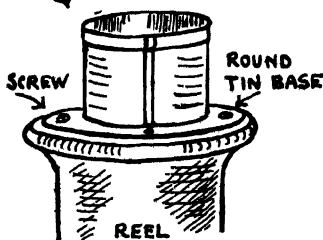
- ④ BEND THE TIN SLOWLY TO A CIRCLE



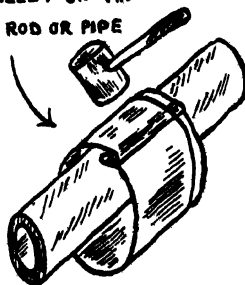
- ② NOTICE THE DIRECTION OF THE FOLDS



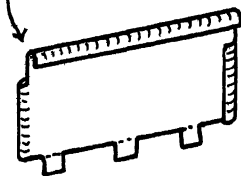
SOCKET MOUNTED ON REEL



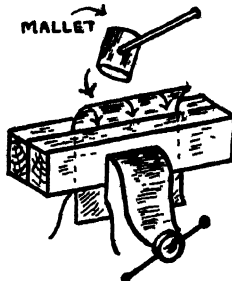
- ⑤ CLOSE SEAM WITH A Mallet ON AN IRON ROD OR PIPE



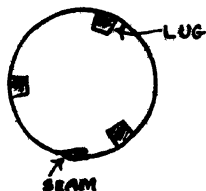
- ③ TIN FOLDED SEAM NOT QUITE CLOSED



Mallet



- ⑥ BEND IN LUGS AND SOLDER THEM TO A TIN BASE



BEND THE FOLDS BETWEEN
PIECES OF WOOD IN THE VICE

AN ELECTRIC LIGHT CANDLESTICK

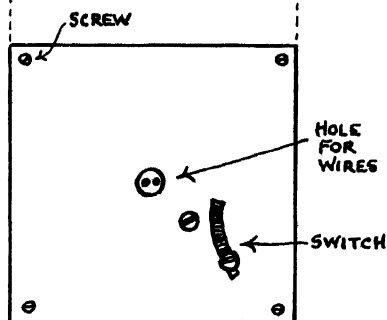
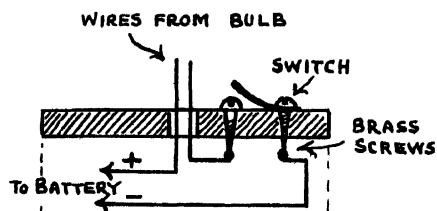
Boys who like playing about with electrical apparatus will be pleased with this idea. All you need is a small dry battery, an electric bulb and holder, a short piece of flex or insulated wire and a switch. Run a piece of flex or two insulated wires up the centre of the candlestick and make connections with the bulb. Test the light with the battery before you fix the bulb and holder on the top of the candlestick. The other ends of the flex or wires go to the battery in the base.

The base as shown in the sketch may be made of a small square flat box just deep enough to hold the dry battery. If the top or bottom of the box is fixed by means of screws it will be easy to open it up to change the battery. The switch is made by fixing two small round-headed brass screws about one inch apart in the top of the box. Drill a small hole at one end of a thin strip of brass and fix this under one of the screws. This strip can be switched on or off to make contact with the other screw. Of course, you can buy a ready-made switch if you like, but it is cheaper and much more fun to make one yourself.

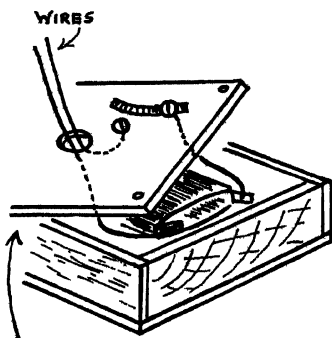
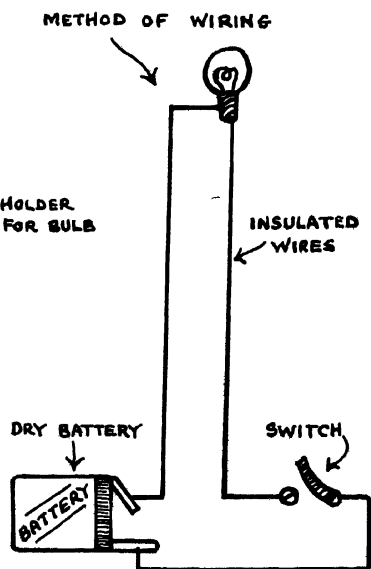
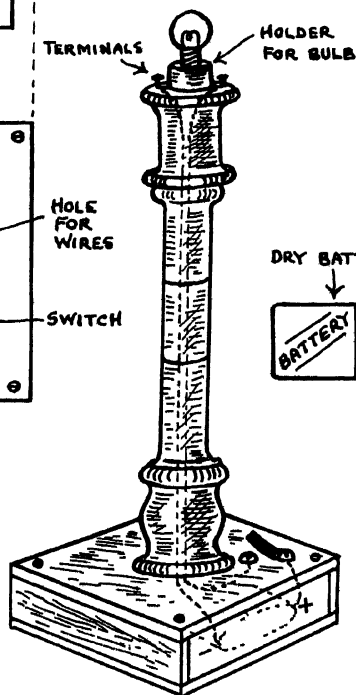
Now to fix the wires. Take one wire straight to a terminal of the battery. Be sure that the end of the wire is clean and fix it securely to make good contact. Solder it if you like. The other wire is secured to the end of one of the switch screws that comes through the top of the base box. Solder a short piece of wire between the other screw and the second terminal of the battery. When the brass strip is in contact with *both* screws the circuit will be complete and the lamp will light. Look at the sketch, follow the connections and you should have no trouble.

Other uses for cotton reels Very often you want wooden wheels for model carts, trucks, wheelbarrows, carriages and engines. First make pencil lines around the reel for whatever width wheels you require. Fix the reel in a vice and carefully cut off your pieces with a tenon saw. If you have a mitre block you will be able to do the job more easily and with greater accuracy than by the vice method. Smooth the surfaces by rubbing them on a piece of glass-paper. Reels are useful for the funnels of ships, smoke stacks of engines, turrets for guns, capstans for ships, bases for cabinets and many other purposes too numerous to mention.

AN ELECTRIC LIGHT CANDLESTICK

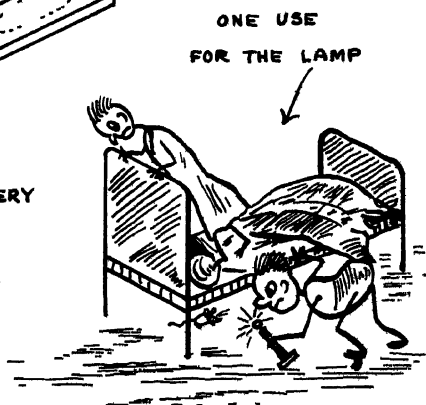


TOP OF BOX



SCREW ON LID LAST OF ALL

PLACE BATTERY
INSIDE
THE BASE



A DRAUGHT OR CHESS BOARD

FIRST let us make a paper and cardboard *draughtboard*, using one-inch squares. The colours of the squares could be black and white, red and green or blue and yellow.

Cut out eight strips of paper one inch wide and eight inches long. Four of the strips one colour (say black) and four strips white. Now draw an eight-inch square on a piece of paper and paste the strips side by side, first black and then white, so that the square is completely covered.

When dry, cut away the surplus paper so that only the eight-inch square is left. With your pencil and ruler mark off one-inch spaces down both sides and draw lines across. Cut carefully along these lines. Next you want a ten-inch square of stiff cardboard. Mark an eight-inch square in the centre of it. Take your first strip and paste it along the top line of the square, beginning with a small black square in the left-hand corner. Take a second strip of squares and paste it underneath but turn the strip round so that you begin with a white square. Carry on until all strips are in position. To make a finished job, gum a framework of cardboard strips along the edge and give the board a coat of varnish.

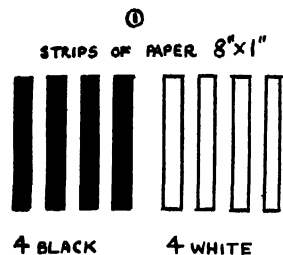
You might make a stronger *chessboard* in the same way, using plywood and glue. But you will find that the edges of your strips will need a lot of attention before they are true enough to make good joints. A mitre block (*see sketch*), however, enables you to mitre the corners perfectly.

This is how you proceed to cut each square accurately. If the strips of wood are one inch wide, measure exactly one inch from the centre cut in your mitre board and from this mark draw a line at right angles across the base. Now get a small piece of wood with a straight edge and nail it along this line so that it will act as a "stop" on the mitre board.

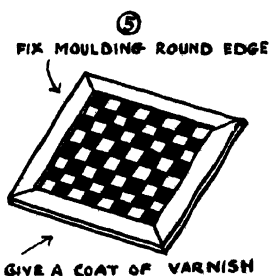
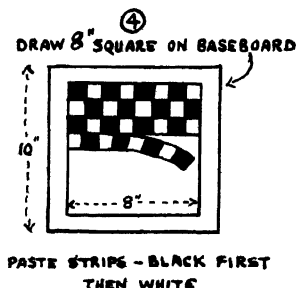
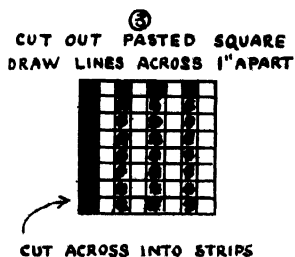
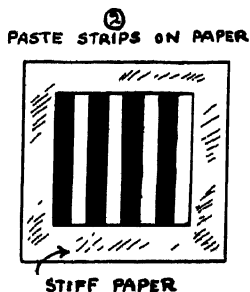
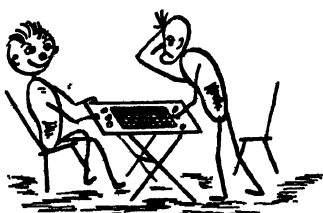
You are now ready to saw off your squares. Push the first strip of plywood up to the "stop," hold it in position and with the tenon saw in the centre slot of the mitre block, cut off the first square. Push the strip up to the "stop" again and cut a second square—and so on.

Glue your squares to a strong base board, fix a nice moulding around the edge, clean up with glass-paper and varnish. Look at the sketches and you will be able to follow the method and make a good substantial board.

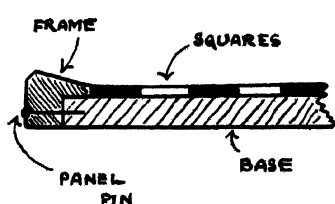
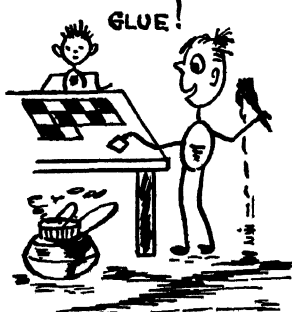
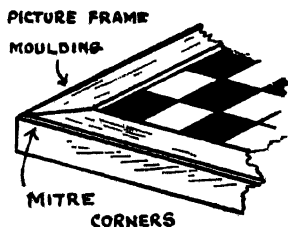
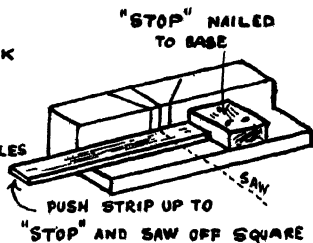
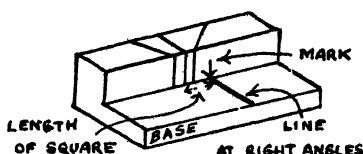
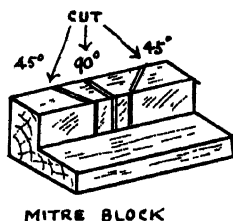
MAKING DRAUGHT BOARDS



YOUR MOVE



CUTTING SQUARES OF WOOD WITH MITRE BLOCK



MODELS IN THIN CARDBOARD

A good model calls for accurate measuring and careful drawing. It does not pay to hurry over the construction. Slovenly work produces lop-sided things that are ugly and useless.

If you use cardboard or paper you will be able to use tabs for fixing the edges of the models without upsetting an accurate fitting. It is impossible to deal with all the models that can be made of cardboard, but we give you a few good ideas and leave you to work out others for yourself.

Look at the sketches before you start with these easy models. On the left-hand side of the page is the plan that you must draw accurately on your cardboard. On the right-hand side is the model with suggested decorations.

For the *Square Tray* you cut along the black lines and score the dotted ones (see note below). The tabs for the tray are shown shaded and these are stuck on the *outside*. Use as little gum or paste as possible and wait till it is tacky before you press the tabs down.

The Screen when cut out only needs folding. Four suitable cigarette cards make nice panels.

The Wall Tidy may be finished in two ways. Either paste a narrow panel down the front, or punch small holes along the edges of Nos. 2 and 3 and lace them together with a piece of silk ribbon.

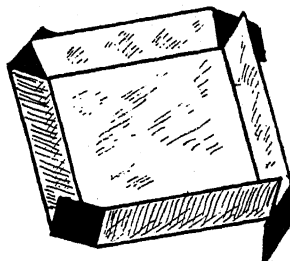
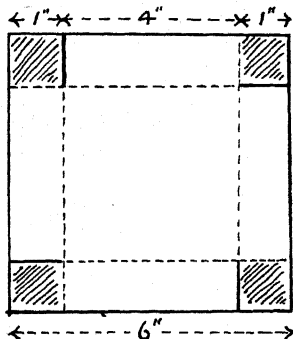
When using scissors always cut *into* a corner. For example, in cutting out the screen you cut from A to B, and then C to B. If you are allowed to use a penknife, hold it nearly upright and cut with the point. Lay your ruler along the line and make a slight impression with the knife at first. Then when you press a little harder the knife will go through the cardboard and not slip away from the cutting edge. Always cut *out* of a corner with a penknife, and do all your cutting on an old board or piece of linoleum.

To *score* a line lay a ruler along it and make a slight impression with the point of your knife or scissors. When you bend this back it will give a clean, straight edge. Mind you don't press too hard or you will cut right through.

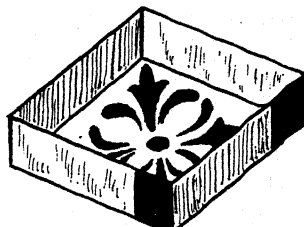
The finished models are greatly improved by decoration with appliqué designs in coloured paper, brushwork or pictures. Cigarette cards sometimes come in very useful for this purpose. Try some of your original ideas by way of decoration.

MODELS IN THIN CARDBOARD

SQUARE TRAY

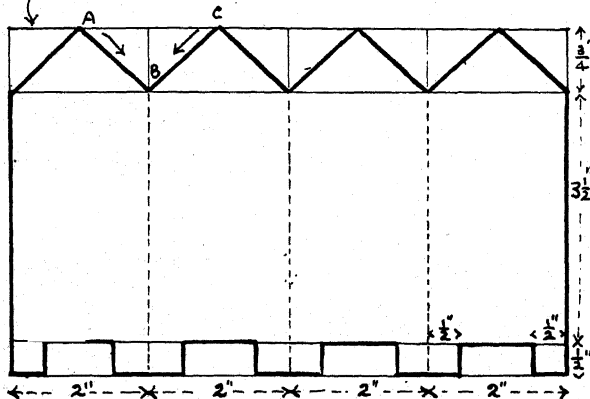


PUT A DESIGN INSIDE
APPLIQUE' WORK LOOKS FINE

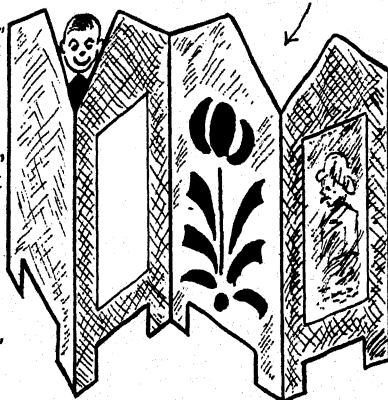


A SCREEN

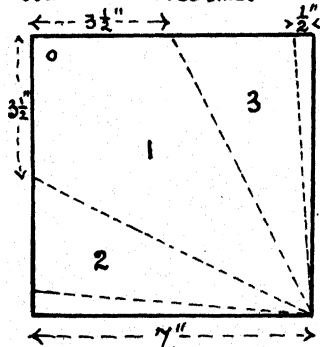
CONSTRUCTION LINES ARE THIN



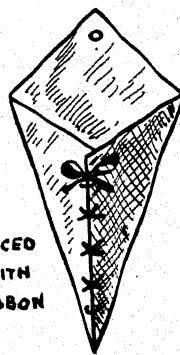
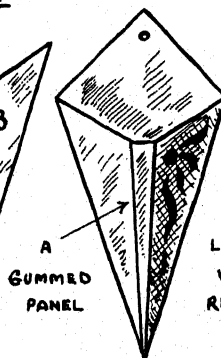
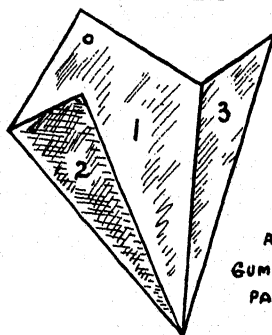
USE CIGARETTE CARDS
FOR THE PANELS
OR MAKE A DESIGN



SCORE THE DOTTED LINES



WALL TIDY



MORE MODELS IN THIN CARDBOARD

HERE are three more models that you will enjoy making

Make the drawing on a piece of cardboard. As before, you cut along the thick black lines and score the dotted lines. The thin lines are for construction only. The tabs that you have to stick down after the model is folded are shaded. There was not room on the page to draw the models full size so we have drawn them to a scale. Don't be in a hurry to finish and do not score the lines too heavily. If you follow the sketches carefully we are quite sure that you will be successful.

When cutting out the *Market Basket* notice that you cut along one sloping side only, you must be sure to leave the tab on the other side or you will have nothing to fix the edge together. The basket looks best if you stick the tabs *inside*, leaving four clean faces for decoration. The handle may be secured with gum either inside or outside the basket. We have shown a rounded handle, but there is no reason why you should not try some other shape

In making the *Photo Frame* cut out the oblong space for the picture with a penknife. When you stick on the cover at the back don't forget to leave the top open so that you can slide your picture in and out easily. If you score and bend under the outside corners of the side pieces, the frame will stand up nicely on the mantelpiece. You can make some more frames to a different design.

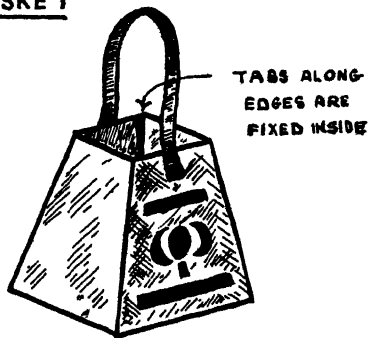
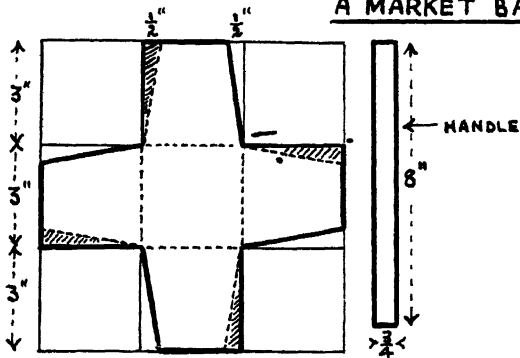
The Punt gives you an opportunity to use compasses. The four sloping sides must be exactly one-and-three-quarter inches deep. This is easily done with the compasses. Look at the curved lines and you will see where to put the point of the compass in order to draw them.

One end of the punt shows you how to fold the cardboard. The two outside tabs are stuck down over the end piece. The sides A and B may either be left sticking out like two ledges over the boat, or you can fold them inside and stick them down.

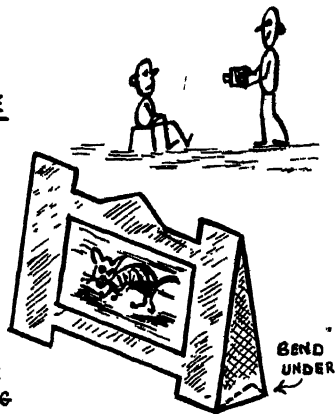
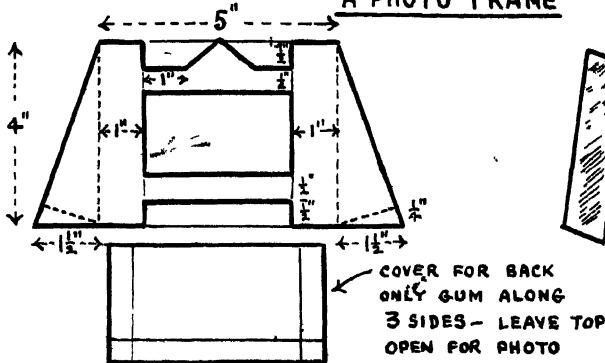
Now see if the punt will float. We do not want to make the construction too difficult for you, so we left the ends without tabs on the under part. See if you can suggest where more tabs should be placed in order to make the punt watertight.

MORE MODELS IN THIN CARDBOARD

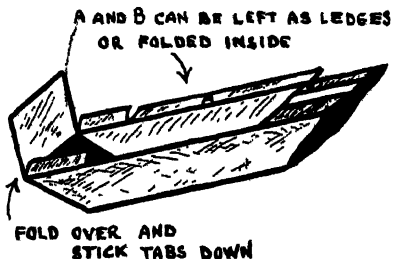
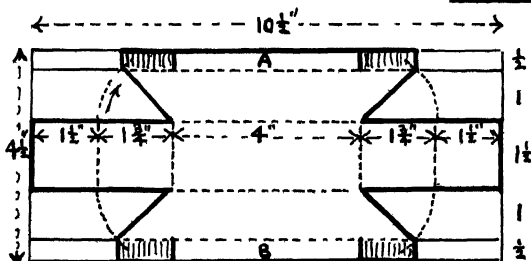
A MARKET BASKET



A PHOTO FRAME



A PUNT



CONCRETE—CRAZY PAVING

Concrete Slabs First mark out on a sheet of brown paper the size and shape of the concrete slabs you are going to make. Lay the paper on a level patch of ground and peg down edging board all around it, thus making a frame. If the boards are first given a thick coating of lime-wash the cement will not stick to them. Lift the paper and spread a half-inch layer of sand on the bottom of the frame. If you decide to make the slabs two-and-a-half or three inches thick then your edging boards should rise three or three-and-a-half inches above the ground.

Now mix three parts clean coarse sand with one part cement, add water and make into a smooth paste. Fill the frame with concrete, puddle it in nicely and smooth off the surface with a wood float. This is a stout flat piece of wood laid across the edging boards. Work the float along the edging boards, carrying the surplus concrete in front of the float and leaving a smooth surface behind. Two people can do this job better than one, so get a chum to help you.

In an hour or so the concrete will set firm enough to cut into slabs. Take a trowel, stand over the frame; lay a straight-edged piece of wood on the concrete and cut along your line straight down into the sand. Your pattern will help you with the lines. The paving cannot be lifted for a day or so; meanwhile, keep it covered with damp newspapers or sacking until it has set firm and hard.

Crazy Paving. If you make crazy or irregular paving proceed in exactly the same way, but mark out irregular lines to get your paving different shapes and sizes.

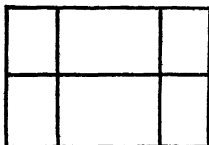
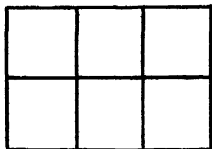
Making a Concrete Garden Path First cut out the path to the right depth and roll it down smooth and firm. To prevent the slabs rocking about, and the weeds growing between them, it is best to set them in a thin bed of concrete. Make this up with four parts sand to one part cement, and spread it about one inch thick on the path as you lay the slabs. Work to a straight edge by pegging down a string line. As you lay the slabs tap them securely into the concrete bed. It makes a better finish to the work if you leave a quarter to half an inch space between the slabs.

When laying a crazy path make sure that you have a straight edge for the *outside* of the path. Leave small pockets here and there between the slabs to be filled in afterwards with a little soil for growing tiny plants along the path. A well-laid path adds to the appearance of a garden.

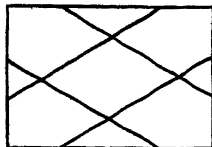
CONCRETE SLABS ~ CRAZY PAVING

MAKE PATTERNS ON BROWN PAPER

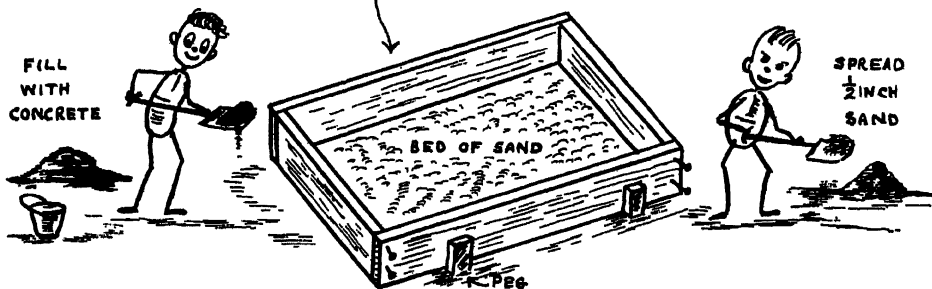
← WIDTH OF PATH →



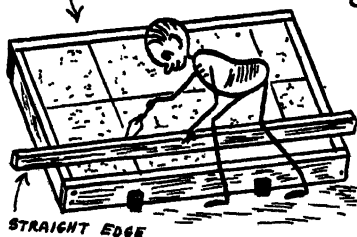
LINES IN CHALK



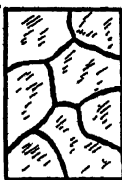
EDGING BOARDS PEGGED DOWN



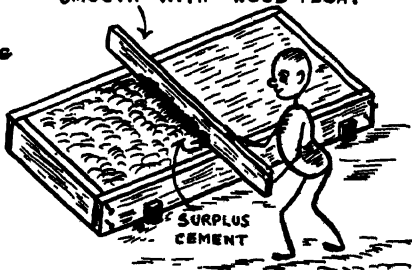
CUT UP INTO SLABS
RIGHT THROUGH TO SAND



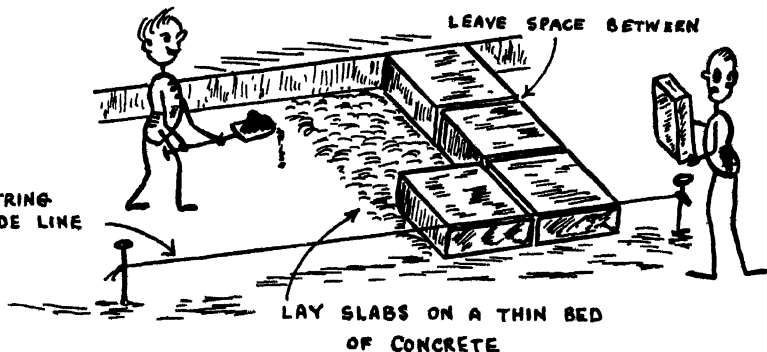
CRAZY PAVING



SMOOTH WITH WOOD FLOAT



STRING
GUIDE LINE



EDGING TILES, BRICKS, LOW WALLS

KEEPING the edges of the flower garden neat and trim is a perpetual garden job. A row of edging tiles or a low wall made of small concrete slabs saves a lot of work and looks very effective. Shall we make some concrete bricks and see what we can build with them?

The bricks or tiles are made in a frame in the same way as slabs were made for the garden path. You can make them one, two, three or four inches thick and cut them to any length and width desirable for the purpose you have in mind. The bricks will look better if their surfaces are rough instead of smooth. To get a rough surface you proceed a little differently. After filling the frame with concrete and leaving it for an hour or so, mark out the bricks with the trowel and straight edge. In this case don't cut through to the sand, but leave off cutting when you are nearly half-way through. Leave for two days and then break the bricks apart. Stack them up in a corner, and keep them damp. In a week they will be quite hard and ready for use.

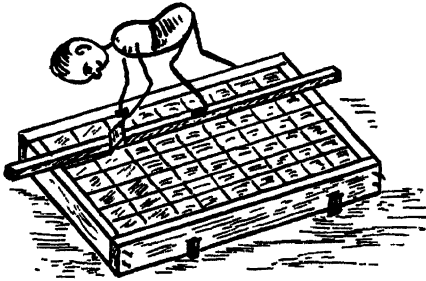
Low Walls To build a low wall first clear and level off the ground. Then mix up a mortar composed of four parts sand to one part cement. Spread an even bed of mortar on the ground and start laying the first row of bricks. Spread more mortar evenly on top of the first row and commence laying the second row, but be careful to place the bricks so that they overlap one another. This can be done by starting the second row with half a brick. If you have watched a bricklayer at work you will have got the idea.

At the ends or at intervals along the wall you might build hollow square piers to be filled afterwards with soil. A hollow wall made with a double row of bricks looks well when filled with earth and planted with flowers. If you leave an occasional brick out of the wall and fill the pocket with earth, plants such as aubretias do well in such a position and add a splash of colour in the spring of the year. Another idea is to scrape away some of the mortar between the bricks. The edges then stand out well and give the wall quite an antique appearance.

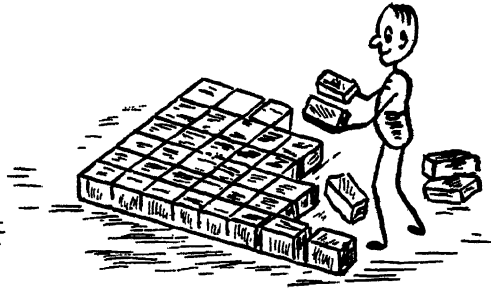
Low brick walls are often very beautiful in design and they add greatly to the layout and general appearance of many gardens. They must be carefully built and put in the most suitable positions. See if you can plan and build a low wall in your own garden.

EDGING TILES - BRICKS - LOW WALLS

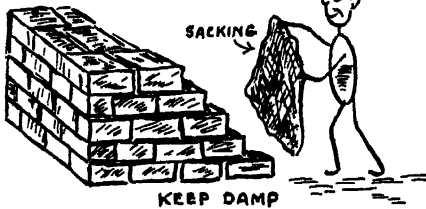
ONLY CUT PARTLY THROUGH



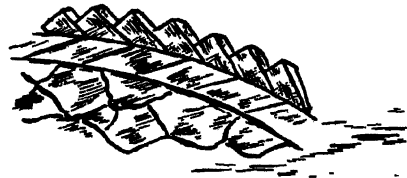
BREAK APART AFTER 2 DAYS



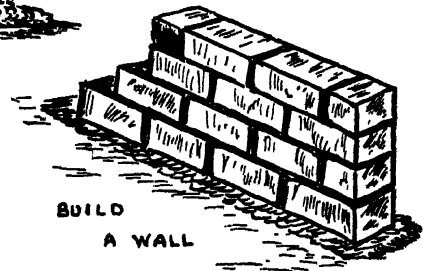
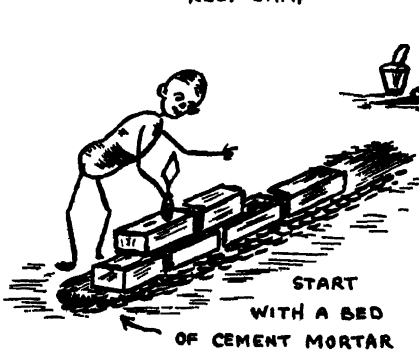
STACK FOR A WEEK



EDGING TILES



MAKE A NEAT BORDER



SQUARE
PIERS



A HOLLOW WALL

MAKING A FISH POND

WHEN the days are fine and warm you will want to do some outdoor jobs. Why not make concrete and build a fish pond? It is great fun, but put on your oldest clothes so that mother will not complain if you get them slightly soiled.

Shall we start by choosing a place for the pond? Any odd corner of the garden will do providing it gets some sunshine for a part of the day. First lay out your design; an irregular one will look more effective and natural, and then dig the hole 18 inches or so deep. Throw the excavated earth up around the sides. This will come in useful to lay out a nice rockery around the pond later on.

Next cover the bottom of the pond with three inches of clinker or ashes. When this is well rammed down you are ready for the concrete.

Making the concrete Take three buckets of sand to every one bucket of cement, and mix thoroughly with the shovel on a flat surface. When the mixture has a grey appearance throughout, make a hole in the centre and add water gradually, mixing the whole into a uniform paste. About half a bucketful of water will get the concrete to the right condition for easy working. Spread this mixture to a depth of three inches over the bottom, but do not start on the sides until the bottom is finished. Build the sides up gradually to about the same thickness as the bottom. Now leave it to harden for a day or two, but cover the job with damp sacking to prevent the hot sun cracking the surface of the concrete.

Before you can stock the pond with fish and plants it must be allowed to season. This takes about two weeks. During this time the pond must be filled with water and emptied twice each week. It assists seasoning if you colour the water with a few crystals of potassium permanganate.

During this period you can arrange stones around the pond and fill the earth into the pockets of the rockery. You might also build a tiny bridge over the pond, in fact, there are dozens of ways to show your artistic ability. A platform of large stones in the centre of the pond with pockets for the fish to hide is another suggestion.

When these jobs are complete you are ready to fill the rockery with plants. Rock rose, arabis, stonecrop, campanulas, flax, aubretia, candytuft, veronica, saxifrage and thyme are all suitable. Finally as a background clumps of blue or yellow irises look very well indeed.

MAKING A FISHPOND

WELL MIXED TO A
UNIFORM GREY
COLOUR



SAND AND CEMENT

MAKING CONCRETE

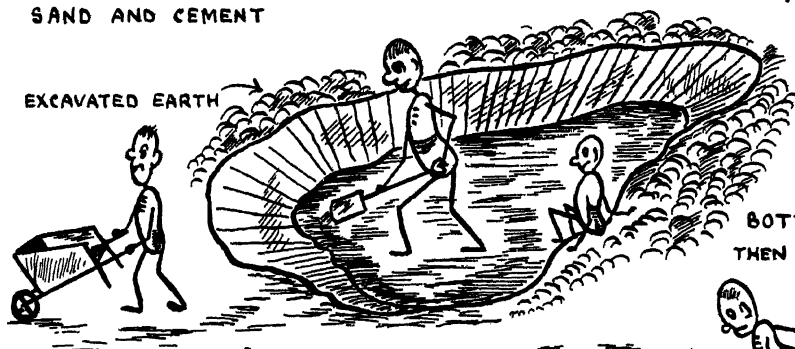


HOLE IN CENTRE
ADD WATER



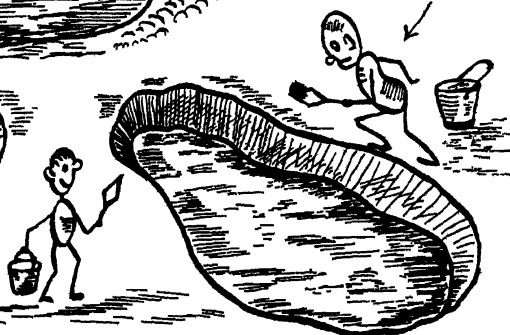
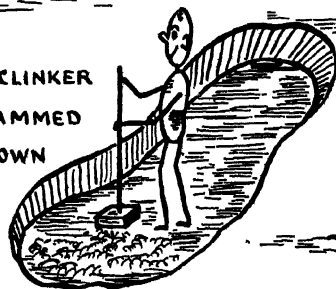
THOROUGHLY
MIX

EXCAVATED EARTH

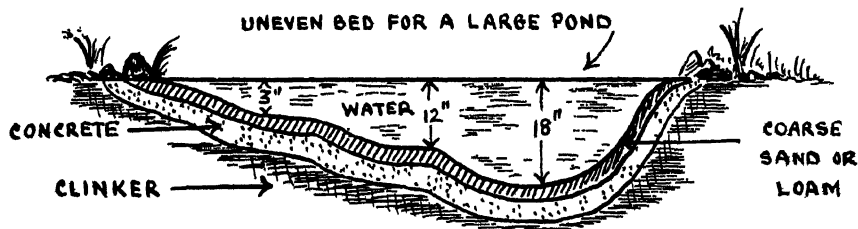


CONCRETE
THE
BOTTOM FIRST
THEN THE SIDES

3" CLINKER
RAMMED
DOWN



UNEVEN BED FOR A LARGE POND



STOCKING A FISH POND

FISH will not do well unless you have suitable water plants, and pond snails too, to keep the water fresh. For your plants to root you will require a layer of clean washed coarse sand on the bottom of the pond. If you are very ambitious and intend to go in for water lilies you will want a larger and deeper pond, and four to six inches of heavy fibrous loam mixed with bone meal well rammed down on the bottom.

To anchor the roots in the sand you can place a small stone over them. Another method is to get small pieces of lead covered electric light wire, or odd pieces of strip lead. Twist a small piece round the base of the plant before you bury it in the sand. This weight will hold it down.

Suitable water plants for a small pond are Canadian pond weed, arrow head, eel grass, water milfoil, ludwigia. You can get them for a few pence at the stores where you buy the fish. There is, of course, a cheaper method. On your next country ramble why not bring home a few water weeds from some pond—you might catch your own fish, snails and mussels too. If you do buy fish remember that your pond is out in the open and will have to stand all sorts of weather. Only the hardy varieties of fish will survive. *Golden orfe* and *carp* do well out of doors.

A pond that varies in depth If the pond is a fairly large one it is best to have an uneven bed. There should be a shallow end, a part where the water is one foot deep, and a deeper part still, say two feet to three feet.

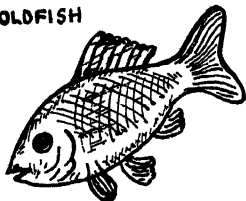
Minnows and golden orfes love the shallow water, goldfish the medium depth, and tench or catfish are good for the deep water as they are good scavengers. The ramshorn snail is probably the best one for your pond. Don't put fish in your pond until the plants are established.

The best plants for shallow water are water lobelia, water forget-me-not and water mint. In deeper water plant myriophyllum, hornwort, water crowfoot and sagittaria. Water lilies like James Hudson (crimson) and Caroliniana (white) make a good showing. If you tie sprigs of willow moss (*Fontinalis*) on some of the stones they will soon become covered with a beautiful mossy cushion. Don't bury the roots too deep when planting. Anchor them as shown, with the crown above the sand.

Emptying the pond is made easy if you have a "soak-away." A novel one can be made with a broken screwtop beer bottle. When making the pond, fix the bottle top in the deepest part of the pond with its screw top end sticking out about three inches so that you can reach the stopper. To empty the pond you simply unscrew the stopper.

STOCKING A FISH POND

GOLDFISH



ORNAMENTAL
FISH POND



GOLDEN ORFE

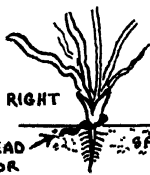
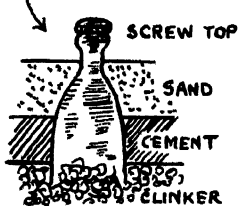


MAKE
POCKETS
FOR
ROCK
PLANTS

RAMSHORN



SOAK AWAY



RIGHT

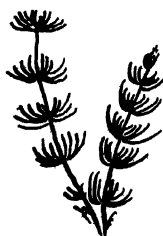
LEAD
FOR
AN ANCHOR



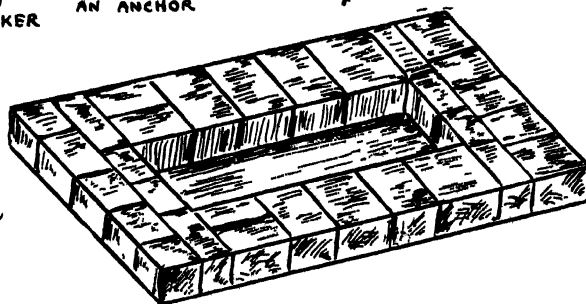
WRONG

TOO DEEP

SNAILS KEEP
THE WATER
CLEAN



HORNWORT



A FORMAL FISH POND
WITH CEMENT SLABS
FOR A SURROUND



WILLOW MOSS

SUNDIALS AND BIRD BATHS

A SUNDIAL or a bird bath looks well in any garden. Why not build one? You think that it is a difficult job to tackle, but if you look at the sketches you will decide that it is not so difficult after all. Notice that the parts are made in sections, and when these are set nice and hard, they are put together in their right positions and fixed with mortar.

First make a sketch of the sundial or bird bath. Next build up your design in frames or moulds of wood. When you nail the sides of the wooden moulds together don't drive the nails home, but leave the heads sticking out, so that you can draw them out easily with the pincers when stripping the mould. Lime wash the inside of the mould and it will not stick to the concrete when you take it apart. Don't be in a hurry to remove the mould; leave it for a week to allow the concrete to set.

Peg the moulds on a bed of sand and fill them with concrete just in the same way as you made the slabs. Now look at the sketches again. The base should be a little larger and deeper than the first platform. The pedestal looks better if the sides taper a little. The pedestal cover is smaller and shallower than the platform, and the top with the wooden peg in the centre smaller still.

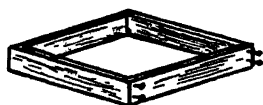
You can economise with the concrete if you fill the core or centre of the moulds with small clinkers, stones or broken bricks. Add them carefully as you proceed with the work, but make sure that they are buried in the concrete, and do not touch the sides of the mould.

If you are making a sundial the wood peg in the centre of the top mould can either be withdrawn to provide a hole for fixing the sundial in concrete, or it can be sawn off level if you are using a screw for fixing purposes. You may be lucky enough to get hold of an old sundial. If not, make one out of a piece of sheet copper. Fix it north and south with a compass or by the sun at midday.

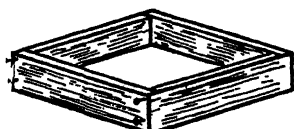
When making a bird bath the top mould is made differently. Fill the pedestal cover with about one inch layer of concrete. Now lay the top mould in the centre of this bed, but instead of putting concrete inside this mould put it in the space between the two moulds. When the concrete is hard remove the middle mould and you will have the well for the water. The finished bath looks better if the edges slope inwards slightly. Do this with a trowel. If you have been busy making slabs and bricks you might prefer to build up a base and pedestal of these. Draw your design on paper. Then mix the mortar and get busy.

SUN DIALS — BIRD BATHS

② PLATFORM



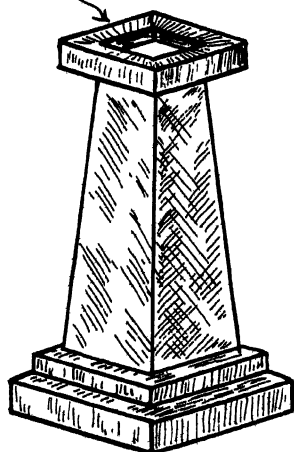
① BASE



SUNDIAL MADE OF COPPER

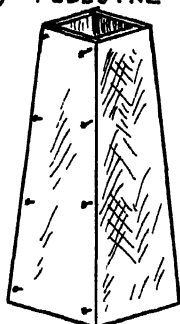


WELL FOR WATER

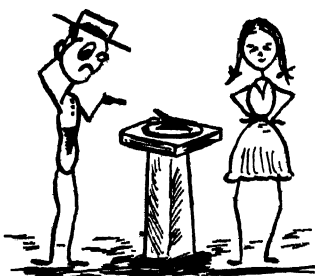
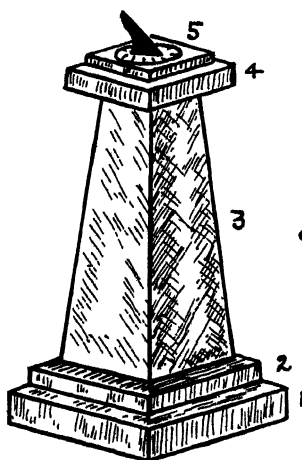


BIRD BATH

③ PEDESTAL



ASSEMBLE THE PARTS



HOW CAN YOU TELL THE TIME
IF THE SUN DON'T SHINE?

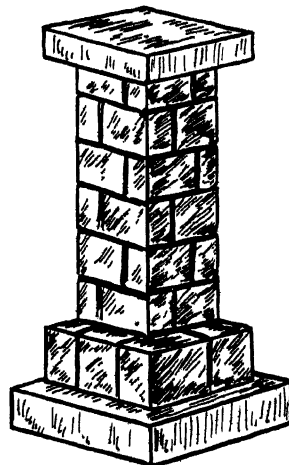
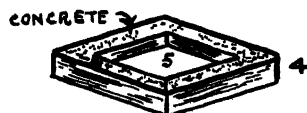
④ PEDESTAL COVER



⑤ TOP — WOOD PEG
IN CENTRE



BIRD BATH
PUT MOULD 5 INTO MOULD 4
ON A THIN BED OF CONCRETE
LEAVE CENTRE HOLLOW



BRICKS AND SLABS

INDOOR AQUARIUM

AN indoor aquarium is very interesting. A glass rectangular tank 12 inches by 12 inches by 18 inches is a good size, but there is no reason why you should not start with a smaller one, providing you don't overstock it. When you have bought the tank, the all-important thing is to prepare it for the fish carefully. Remember, too, that the tank will be very heavy when full of water, so stand it on very strong supports in a place that gets some sun for a part of the day.

First, wash well some coarse sand in several changes of water until the water is not cloudy. Cover the bottom of the tank with this clean sand to a depth of about two inches which should be sloping slightly towards the front. On the top of the sand arrange some nice pebbles and a few ornamental stones. Although plants will grow in sand, they do better in loam. If you decide to use loam, bury it between two layers of sand like meat in a sandwich. Now cover the top of the sand with a sheet of paper and pour in carefully about two inches of water. The paper prevents the sand and pebbles from being disturbed.

The next job is to put in your plants. Lift out the sheet of paper carefully. If you buy plants, you will find that *Sagittaria*, *Vallisneria* and *Ludwigia* look well at the back and sides, whilst *Myriophyllum* and *Ceratophyllum* are placed nearer the front. Don't bury the roots too deep. Cuttings should just be anchored with a twisted strip of lead—they will root themselves. If you tie sprigs of *Fontinalis* on the stones they will grow to a mossy cushion. Of course you may collect the water plants from ponds, but always wash them in dilute potassium permanganate and then in clean water before you put them in the tank, in order to prevent disease. Next put your sheet of paper in once more and fill up carefully with water, so as not to disturb your arrangement.

Now you must wait two weeks to get the plants established before introducing the fish. Start with small fish and not too many. One two-inch fish to every gallon of water is a safe rule. You will require about a dozen water snails, for they are the scavengers that keep the tank clean. To keep dust out you need a sheet of glass on top supported on little pieces of indiarubber (*see sketch*).

Finally, a long piece of glass tubing open at both ends is handy to remove the rubbish that collects on the sand. Close the top with your finger and push the tube down to the rubbish. Release your finger and the rubbish will be forced into the tube. Put your finger on top again and withdraw the tube with the rubbish. Don't disturb the fish too often.

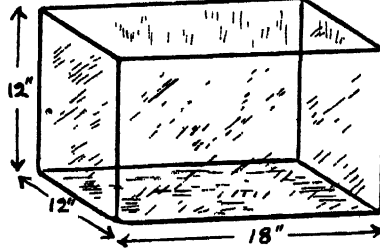
INDOOR AQUARIUM

WASH SAND IN A
BUCKET OF WATER



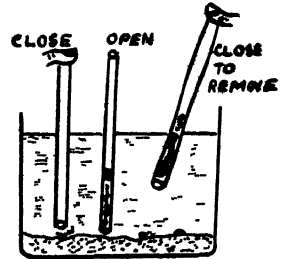
CHANGE WATER TILL
IT IS NOT CLOUDY

THE RIGHT KIND OF TANK



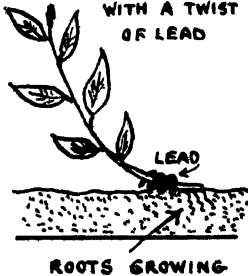
①

REMOVE RUBBISH
FROM TANK



RUBBISH FORCED UP
TUBE WHEN YOU OPEN TOP

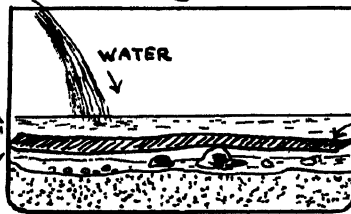
CUTTINGS
HELD DOWN
WITH A TWIST
OF LEAD



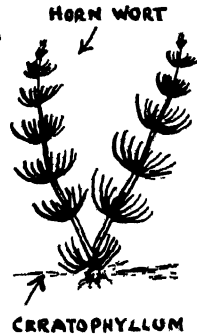
ROOTS GROWING



②



WATER POURED ON PAPER COVER

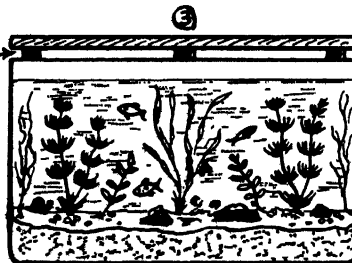


CERATOPHYLLUM

RAMSHORN SNAIL



PIECES
OF
RUBBER



ARRANGE PLANTS TOWARDS BACK

FRESH WATER MUSSEL



THICK CARDBOARD MODELS

MODELS in thick cardboard are much stronger and more substantial than those in thin card. If they are made with art tinted cardboard you will be very proud of your work when it is finished.

You cannot make "tab" joints when working in thick cardboard. They would throw the model out of shape and spoil its final appearance.

You will probably find that the cardboard is too thick to cut with scissors, therefore it is best to cut the model out with a sharp-pointed knife. Keep the point sharp by an occasional rub on an oil-stone.

Don't forget to hold the knife almost perpendicular along the ruler, and don't try to cut through the cardboard in one go. First time press gently and just get through the surface, then go over the line again and press harder and you will find that the knife will gradually go through the cardboard and not slip away from the cutting edge. Clean-cut edges and not ragged ones are what you want. When the model is cut out score the dotted lines that have to be bent, but mind you don't cut through them.

Now the question arises of how to fix the edges. This is done by means of gummed binding strips. You can make your own strips if you like or you can buy reels of binding strip in strong coloured paper very cheaply.

To put on a strip, first cut it the right length. Then fold it in half with the gum inside, to make sure that the edge is straight. Now open up the strip and wet the gum with water, using one of your paint brushes. Hold the two edges of the model together with your left hand, and lay the strip evenly along either side. Rub it down with your fingers and don't release your grip on the model until you are sure that the edge is secure. The binding looks best if you mitre the corners. This means that the ends of the binding strips are cut at an angle of 45° (*see sketch*).

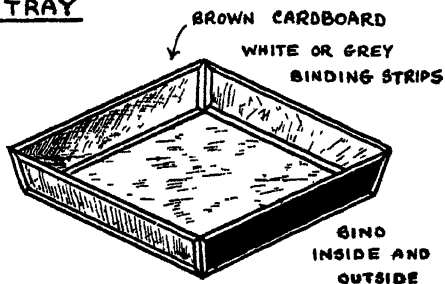
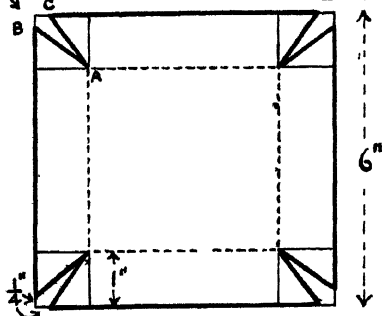
When cutting out *the Square Tray*, the cuts in the corners are made in an outward direction, *i.e.*, from A to B and A to C. Bind the corners first, and for additional strength do this both inside and outside. Decorate the model to your own taste. It will make a nice pin tray for the dressing table. Why not make a set with oblong trays as well as square ones?

A Spill Stand for the mantelshelf would save wasting matches, and Dad would appreciate it. The top and the base are bound separately with binding strips. When completed, the bottom of the holder is covered with glue, gum or seccotine and stuck in position on the base.

MODELS IN THICK CARDBOARD

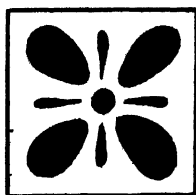
CUT OUTWARD FROM A

A PIN TRAY



MITRE THE CORNERS

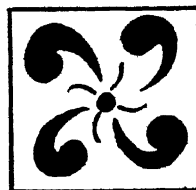
DESIGN FOR INSIDE



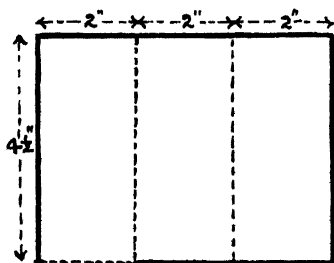
SCORE DOTTED LINES



BINDING STRIPS



A SPILL STAND

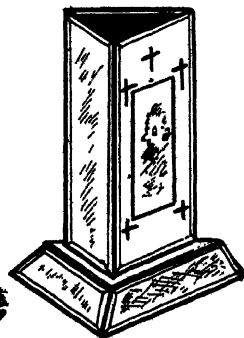


BRUSHWORK DESIGN
OR
COLOURED PAPER



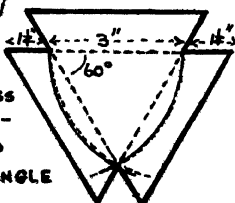
CAN YOU
DO THIS?

GREY CARD AND
BLUE BINDING



GUM THE STAND
TO THE BASE AND
DECORATE THE PANELS

USE COMPASS
OR 60° SET-
SQUARE TO
DRAW TRIANGLE



BISCUIT JAR AND DOG KENNEL

HERE are two more models in thick cardboard, so get your knife well sharpened, for the success of the models will depend upon having clean straight edges.

The Biscuit Jar can be put to many uses. You will notice that the bottom part is constructed just like the market basket (p. 52). Here, however, binding strips are going to take the place of tabs, so be quite sure that the adjoining edges exactly meet each other when you bend up the card to make the sides. Bind the sloping edges first and don't release your grip of them until they are stuck securely together.

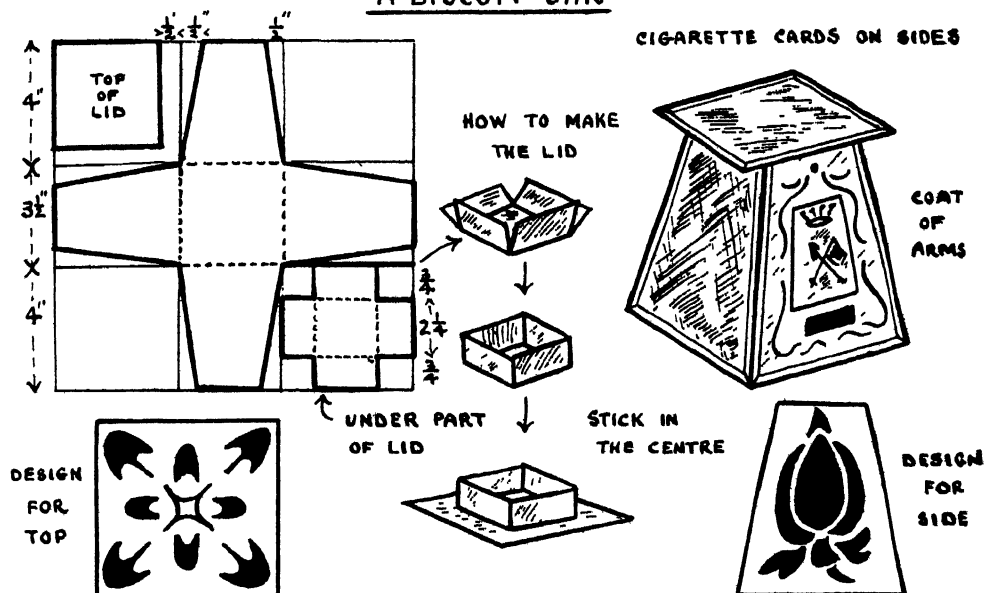
The lid is made in two parts and then gummed together. The sketches show clearly how this is done. Notice in the sketch that the part of the lid that fits into the jar measures two-and-a-quarter inches. This measurement will vary with the thickness of the cardboard. If you want to get a good fit, it is best to make the mouth of the jar first, and then take the inside measurement of the mouth with a ruler. Follow this method and you can't go wrong. Various designs are suggested for the jar. Appliqué work in coloured paper, brushwork or four suitable pictures stuck on the sides all look good, but this is a matter for your own personal taste.

The plan for making the *Dog Kennel* needs very little explanation. Be very accurate in measuring your drawing, otherwise it will not fit together nicely when it is scored and folded. You will notice that the two sides of the roof meet at the top, and we suggest that you secure the top of the roof first with a strip of binding.

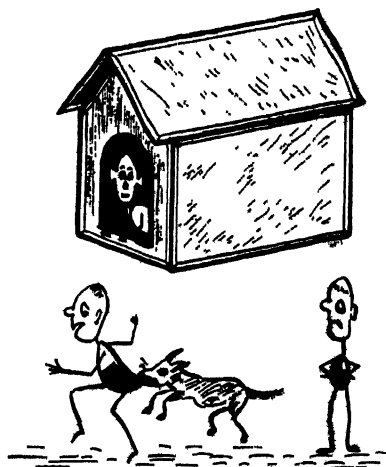
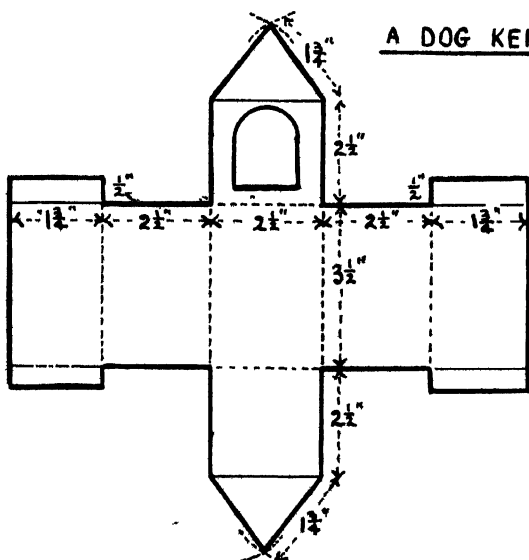
The entrance to the kennel is semi-circular at the top. It is necessary to be very careful in cutting round the curve, and you will do better if you practise this on a spare bit of cardboard before you attempt the job. Of course, you could make a square entrance to the kennel if you like. If you have a small toy dog, put it inside and make a finished job of it. Don't forget to print a notice, "BEWARE OF THE DOG."

BISCUIT JAR - DOG KENNEL

A BISCUIT JAR



A DOG KENNEL



FRUIT DISH AND FLOWER VASE

THESE two models really look first class when made up in art cardboard, and they are quite acceptable presents

Fruit Dish. To make a neat strong job of the fruit dish, the edges should be secured with binding strips both inside and outside. The layout gives you a chance to use compasses. Get your cardboard ready and make the drawing very carefully. First draw a circle with four-and-a-half-inch radius. Now step the radius out round the circumference. It should go exactly six times. Join the six points and you will get a hexagon, *i.e.*, a six-sided figure. Join the opposite corners, each line being a diameter and passing through the centre. Next draw another circle from the same centre with one-and-a-half-inch radius. Where it cuts the diameters join with straight lines, as shown in the diagram, and you have the inside hexagon that forms the base of the dish. Now mark half-inch gaps from each corner of the outside hexagon as shown in the diagram, and draw the V-shape gaps that are to be cut out.

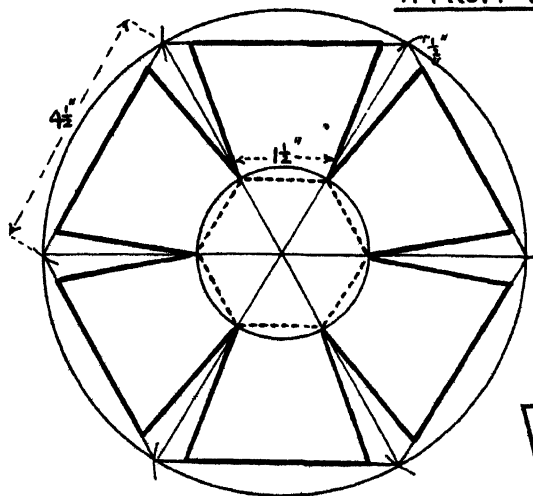
The sketches show you clearly how the rest is done. The finished model makes a pleasing ornament for any room, and you will have no difficulty in finding uses for it.

Flower Vase. As you can see from a study of the sketch on the opposite page, the flower vase is made in two pieces. Make the plan on your cardboard. Cut and fold the model as shown. Bind the top and the base separately and when completed stick them together. A final binding strip around the outside of the join will make the job more secure. It will be wise also to put binding strips along the edges on the underside of the base. The four panels lend themselves to quite a number of ideas by way of decoration. The tulip design looks very smart when cut out in paper and suits the long panels excellently.

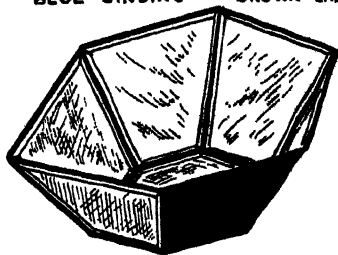
It is a pity that we cannot afford more space in this book for this fascinating work, but you can use your own ideas. Look around and you will see different shape boxes, lampshades, vases, furniture for dolls' houses and many other objects, that will make good models for you to construct in cardboard. If you are keen, get busy, but always plan the model out first as accurately as possible. *And don't waste cardboard.*

FRUIT DISH ~ FLOWER VASE

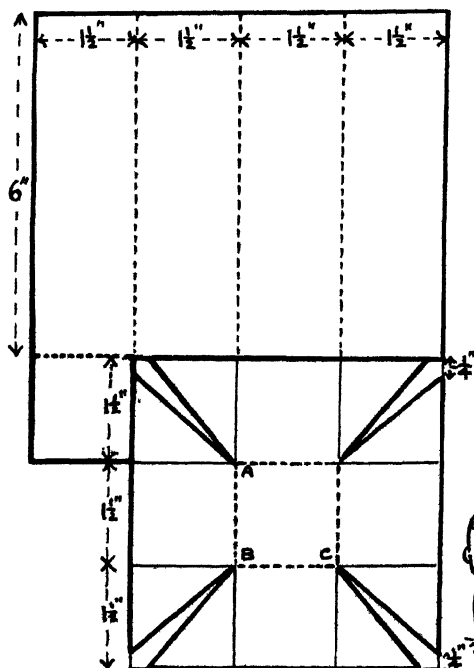
A FRUIT DISH



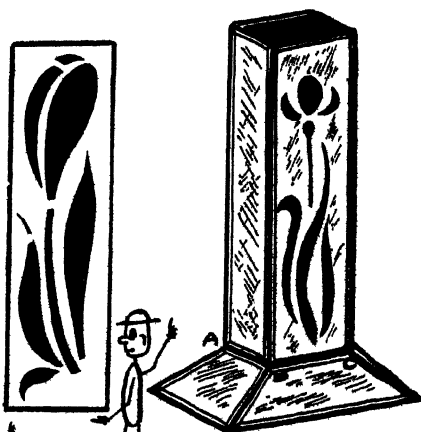
BLUE BINDING BROWN CARD



DESIGNS IN BRUSHWORK
OR COLOURED PAPER ARE EFFECTIVE



A FLOWER VASE



GREEN CARD AND
GREY BINDING

FRAMING A PICTURE

PASSE-PARTOUT framing is cheap, easy and effective, and it gives us a chance, too, to use up odd pieces of glass at the same time.

You will probably find that binding strips about one inch wide are best for your purpose. In addition you will require a piece of stout cardboard, cut to the same size as the glass, as a backing for the picture.

Let us frame a picture now. First decide if the picture will show to best advantage, if it covers all the glass, or if it requires a mount. Fancy notepaper often makes a good mount, and the sketches opposite give you some ideas on mounting.

Cut out the cardboard backing, place the picture, mounted or otherwise, on top, cover with the sheet of glass, and see that everything is square and true.

Before we commence binding we shall have to think out a simple method for hanging the picture on the wall. Cut two slits about one-third down from the top of the cardboard back (*see sketch*). Now get two small metal rings and two short pieces of tape. Tie or sew each ring in the middle of its piece of tape. Push the ends of the tape through the slits in the card, pull up tightly, spread out flat and glue the tape to the inside of the back. We are now ready for binding.

Clip the glass and cardboard together with paper clips, spring clothes-pegs or string bound round so that nothing moves out of position. Bind the long sides first. Cut off two lengths of binding strip and fold one edge over about a quarter of an inch. This quarter-inch fold is stuck on the glass, and folded carefully to make sure that you have a uniform edge in front of the picture. Next wet the binding strip, stick it first along the front glass, then bend it along the edge of glass and cardboard, and fold down on the back. Rub the binding down securely with a soft cloth.

Now remove the clips, and cut binding strips for the sides this time; don't forget to mitre the corners. Stick them in position in the same manner as before. Finally tie a length of picture cord on the rings, and there's your picture ready to decorate a wall.

You may prefer to stand the picture on the mantelshelf. This means having a rest at the back instead of rings. All you have to do is to cut out a wing of cardboard as shown. Score the dotted line AB, bend it at right angles, and glue the strap ABCD on the back of the frame. The line BE will rest on the mantelpiece so that the picture slopes slightly.

FRAMING A PICTURE

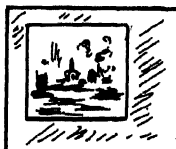


DIFFERENT
STYLES OF
MOUNTING
PICTURES

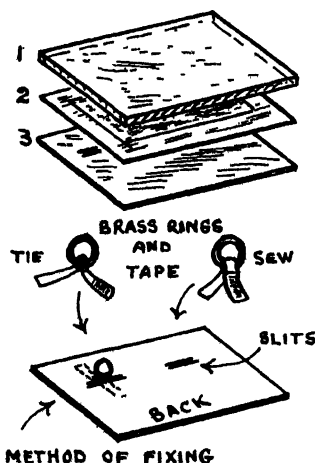


LOOK OUT!

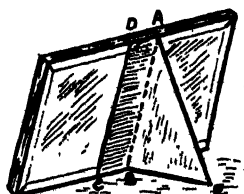
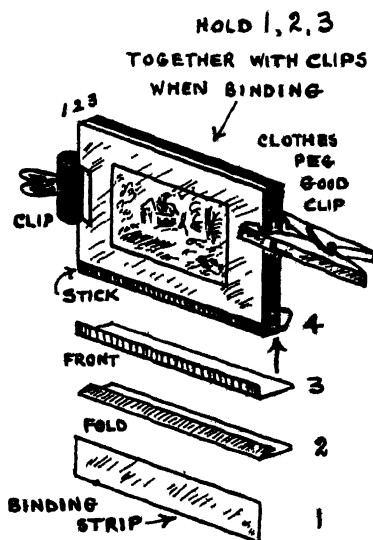
ARTISTIC
NOTE PAPER
MAKES GOOD
MOUNTS



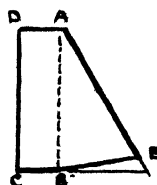
1. GLASS
2. PICTURE
3. CARDBOARD



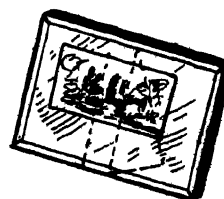
PASSE PARTOUT



BACK VIEW



CARDBOARD WING
GLUED ON BACK



FRONT VIEW

WOOD-WORKING TOOLS

THE wood models in this book can be made with the simple tools in the home, but if you are lucky enough to possess the right tools you can do the work more easily and accurately. You will enjoy making these models, and may wish to fit up a workshop of your own. There is no need to buy a large number of tools. Remember it is better to have a few good tools than many cheap ones. Cheap chisels and planes do not keep a cutting edge. Here are a few suggestions to help you.

A good strong table, or better still, a bench with a vice is the first thing of importance. Next you want two saws, a ten-inch tenon saw and a panel saw for cutting bigger pieces of wood. Don't buy rip or cross-cut saws since they are designed to cut with the grain or across the grain respectively. A panel saw cuts in any direction. A good wooden jack plane fifteen inches long with a two-inch cutting iron comes next, or if you can afford it, an adjustable iron smoothing plane. Three chisels, one-inch, a half-inch, and a quarter-inch will do for most of the models. A hammer, No. 1½, is a useful weight, and no doubt there are pincers, screwdriver and bradawl in the house already.

For setting out tools it is useful to have a try square, a twelve-inch steel rule and a marking gauge. Other useful tools can be bought as the need arises. A brace and some centre bits will come in very useful for boring holes, also a countersink for burying the heads of screws. A mallet is very useful, so is a spokeshave when you want to curve or shape up a piece of wood.

If you have done some metal work you will probably have a drill and some drills. These will also be found very useful in woodwork. You will wish to sharpen your own plane and chisels, for they are not much good if allowed to get blunt. An Indian oilstone is the best one to get, and the best oil to use is either neatsfoot or olive oil. The sketches opposite show you how to do the sharpening, and how to hold some of the tools.

If you have not been shown how to hold the different tools, why not have a friendly chat with a carpenter and get him to show you. He will be delighted to do so. You are not likely to have an accident if you follow his directions. Cut fingers are a nuisance.

WOOD-WORKING TOOLS

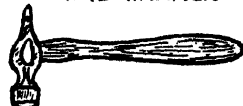
PANEL SAW



HOLDING THE TENON SAW



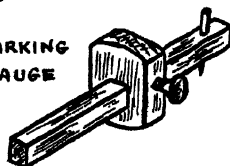
N^o 1½ HAMMER



12" STEEL RULE



MARKING GAUGE



HOLDING THE JACK PLANE



SPOKESHAVE



TRY SQUARE

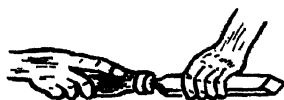


BRACE

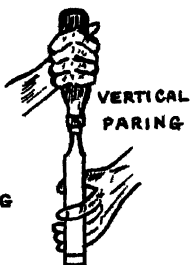


COUNTERSINK BIT

HOLDING THE CHISEL



HORIZONTAL PARING

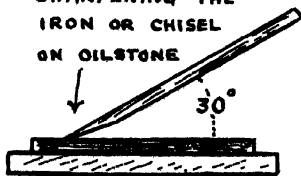


VERTICAL PARING



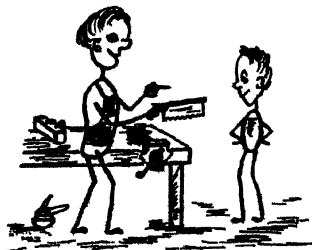
MALLET

SHARPENING THE IRON OR CHISEL ON OILSTONE

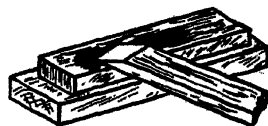


KEEP AT 30° TO OILSTONE.
RUB BACKWARDS AND
FORWARDS BUT DO NOT
VARY THE ANGLE

ASK A CARPENTER TO SHOW YOU



KEEP YOUR TOOLS SHARP



FINISH BY RUBBING OFF
BURR WITH THE FLAT
SIDE OF TOOL ON THE
OILSTONE

BENCH HOOK AND MITRE BLOCK

THE bench hook is used to saw and to chisel and prevents cutting the bench top. The mitre block enables you to cut a square end to a piece of wood, or angles of 45° so that two pieces of wood can be fitted together at right angles like the corners of a picture frame. The best wood to use in both cases is beech.

Let us make the *Bench Hook* first. You require three pieces of wood, one piece 10 in. by 8 in. by 1 in., and two pieces 7 in. by $1\frac{3}{4}$ in. by $1\frac{3}{4}$ in. A length of dowel rod five-sixteenths of an inch is used for fixing the pieces together. Look at the sketches and you will see how it is made.

First plane the wood so that the faces are flat and square to each other. Holes are next drilled right through the blocks and board to correspond with each other. Finally pieces of dowel rod are glued and driven through these holes. The reason we don't use nails or screws is that we might damage the cutting edges of our tools on them when in use.

A *Mitre Board* is not quite so easy to make. Four pieces of wood are required. 12 in. by 3 in. by 3 in., 12 in. by 5 in. by 1 in., 12 in. by 2 in. by 1 in., and 12 in. by 1 in. by 1 in. Plane the wood carefully and see that all the surfaces are flat, then assemble them as shown in the sketch. You may fix with screws this time. Drill holes for them and countersink the heads of the screws. Keep the screws near the ends so that they will not come near the saw cuts.

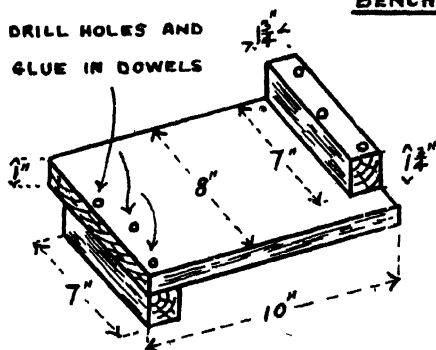
The saw cuts must be made very carefully. Set out the lines for the cuts with a try square, and make sure they are right. First put one line across the middle. To get 45° cuts mark two lines as shown and then draw across the corners. Next mark the vertical lines. Finally fix the block in the vice and cut very carefully with the tenon saw, keeping to the lines all the time. You will notice that the piece of wood No. 2 is necessary to stop the saw cuts from going right through the big block No. 1.

You can buy mitre blocks at the tool shop, but you will find that they are not so big as this one; and the saw cuts in small blocks soon become inaccurate. When your saw cuts become the worse for wear, you can set out new ones by the side of the old ones.

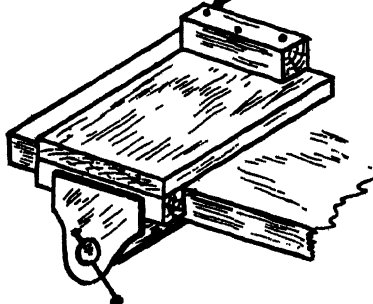
BENCH HOOK - MITRE BLOCK

BENCH HOOK

DRILL HOLES AND
GLUE IN DOWELS



FIX IN VICE WHEN YOU USE IT
AND IT WILL NOT TIP UP

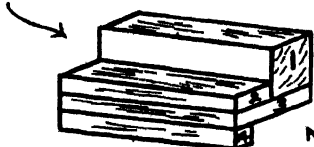


MITRE BLOCK



FOUR PIECES OF BEECH WOOD

WAY TO PUT PIECES TOGETHER



UNDER SIDE

SCREWS AT ENDS

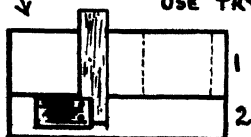
N°2 STOPS SAW CUTS
FROM GOING RIGHT
THROUGH

N°4 FIX IN VICE OR
PUSH AGAINST TABLE

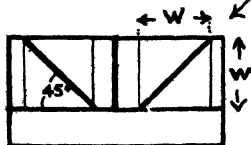


THE MARKING OUT

USE TRY SQUARE



HOW TO
GET THE
45° CUTS

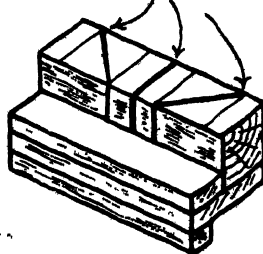


SQUARE
CORNERS



MAKE VERTICAL CUTS

WITH TENON SAW



A USE FOR MITRE BLOCK

THE OBEDIENT PROPELLER

HERE is a toy that will puzzle your friends until you let them into the secret of how it is done. Hold the handle of the propeller and rub the notches up and down with the edge of a piece of wood, and the propeller will spin round. Now for the secret. If you press with your finger on the left-hand sloping side of the shaft just beyond the handle, the propeller will turn one way. Now change over and press on the right-hand side and the propeller will turn the other way. Quite a good trick, isn't it?

To make the toy you require two pieces of hard wood, one piece 8 in. by $\frac{1}{2}$ in. by $\frac{1}{2}$ in. for the shaft, and the other piece 6 in. by $\frac{1}{2}$ in. by $\frac{1}{2}$ in. for the propeller and rubber. Mark out the shaft as shown in the sketch, two inches for the handle and one-eighth inch for the notches. These small divisions should be marked carefully.

To cut the notches it is best to place the shaft in a vice and use a chisel, but they can be cut also with a sharp penknife. Each notch takes three cuts with the chisel to complete it. Try to do it in three, not more. Starting at the second marking do the vertical cuts first, *but miss every other one*. Next do the cuts to the left and then the right. The sketches show you how to get clean sharp cuts.

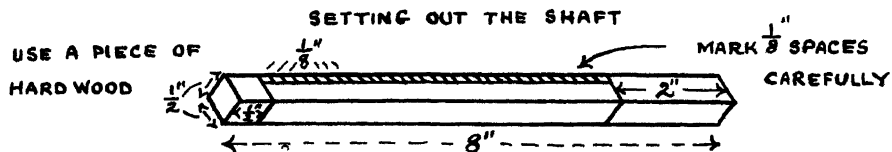
The handle is now made by cutting away the upper and lower edges. Finally shape the end for the propeller by rounding off the four corners.

The propeller and rubber is next marked off from the second strip of wood. Cut off and shape the propeller and see that the hole for the pin is bored exactly in the centre. Now balance the propeller on the pin or small nail. If one end is heavier than the other, cut away a little from the heavier side until the balance is right. See that the propeller turns freely on the pin.

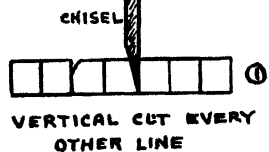
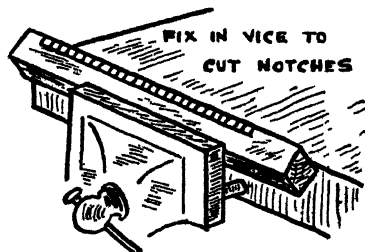
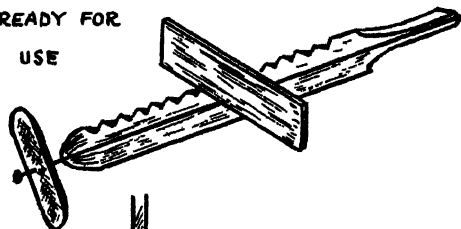
Finally assemble the parts as shown in the sketches. Rub up and down the notches and the propeller will buzz round. Practise pressing on either side of the shaft, and when you are certain that your propeller is obedient and will turn left or right at your wish, show it to your friends.

If you like you can fix plywood wings to the sides of the shaft and turn the toy into an aeroplane.

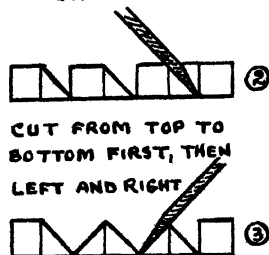
THE OBEDIENT PROPELLER



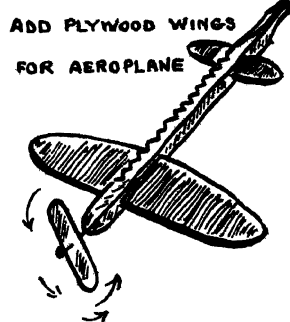
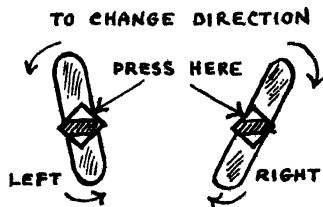
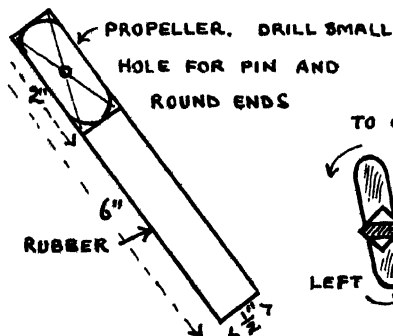
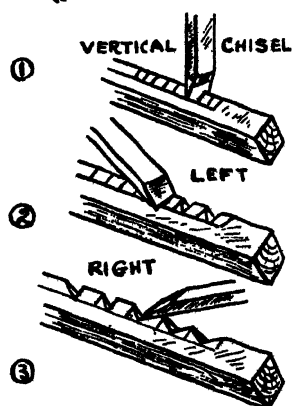
READY FOR
USE



CUTTING
THE
NOTCHES



HOW TO SHAPE
THE HANDLE



A FLYING PROPELLER

HAVE you ever seen the winged seeds of the sycamore tree come spinning down to the ground? Here is an idea which will remind you of them.

This propeller goes sailing away up in the air spinning all the time. It is quite easy to make. You will require one piece of wood 6 in. by $1\frac{1}{4}$ in. by $\frac{3}{4}$ in. for the propeller, a piece 7 in. by 1 in. by 1 in. for the handle, a quarter-inch dowel rod about six inches long or a meat skewer, and two strips of fairly stiff metal two-and-a-half inches long and one inch wide.

First plane up the wood to the right size, and then start straight on the propeller by drilling a hole through the middle for the dowel rod. Now mark out the shape and cut away the waste wood with a pocket knife or chisel. Smooth it up nicely with glass-paper, fix the dowel rod in the propeller with a small nail, but leave the drilling of the small hole for threading the string until you have finished the handle and can judge the best place for it.

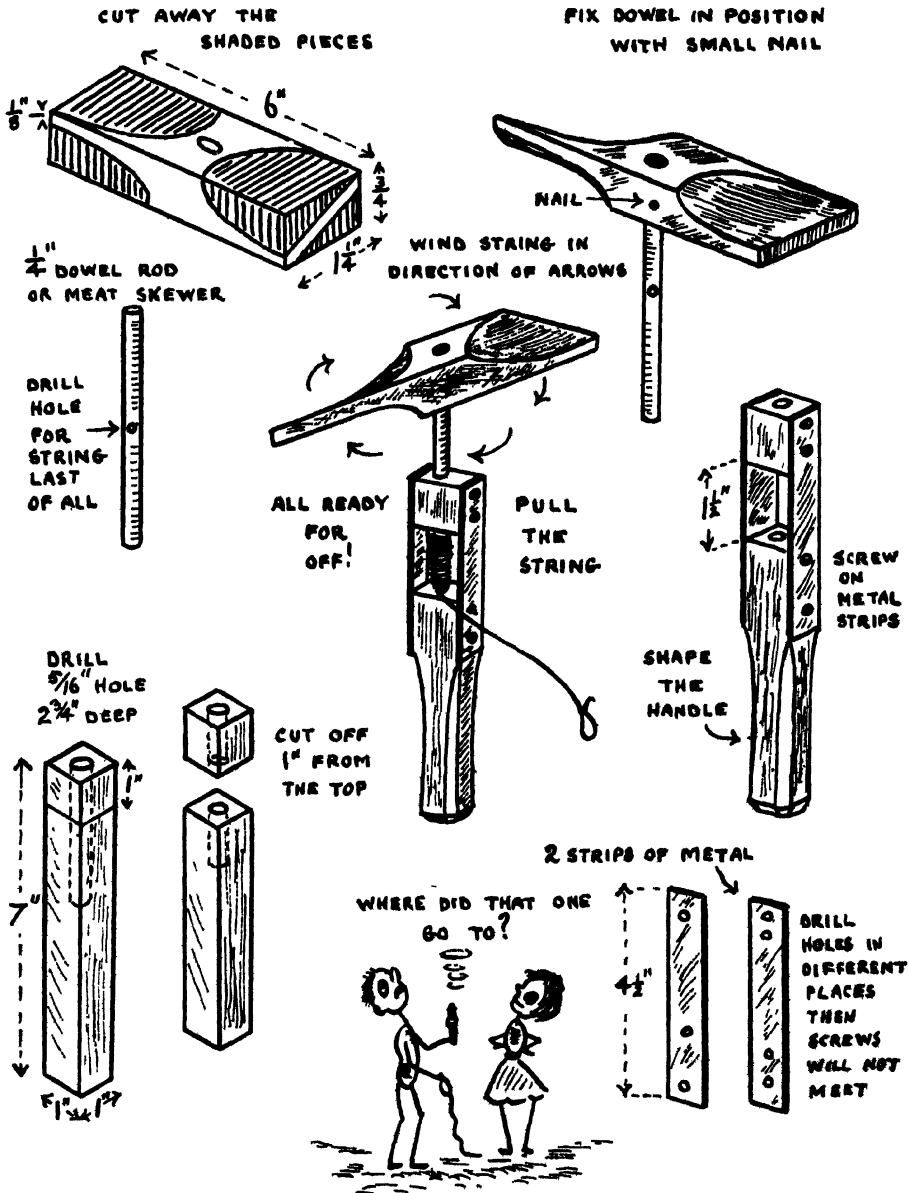
Now commence work on the handle by drilling a five-sixteenth-inch hole about two-and-three-quarters inches deep. This will require care to get it nicely centred. Now cut a piece one inch long off the end, as shown in the sketch.

Next you drill holes in the metal strips, but arrange them so that the screws on one side will not meet those from the other side. When ready fix the strips of metal in position with small screws. Finally shape up the handle by cutting away the corners with your pocket knife.

Now we are ready for a trial flight. Thread the end of the string through the small hole in the dowel rod. Wind up the string by twisting the propeller in the direction shown. Give the string a sharp pull and away it goes.

Here is a warning. We don't want you to lose the propeller on the roof, so stand well away from the house. As a matter of fact, the park or an open field is the place to see the propeller to best advantage.

A FLYING PROPELLER



HAMMER AND NAILS

You can keep some people quiet for quite a long time if you give them some nails, a hammer and a few pieces of wood. But to do a nailing job properly you want the right kind of nails. The sketches opposite give you the names of the nails in common use.

Cut nails and *French nails* are used for heavy work where thick pieces of wood are nailed together. *Oval wire nails* find their use for medium sized work, whilst *panel pins* are best for fine work and thin wood. The *clout nail* has a large flat head and may be used for holding down thin metal or roofing felt.

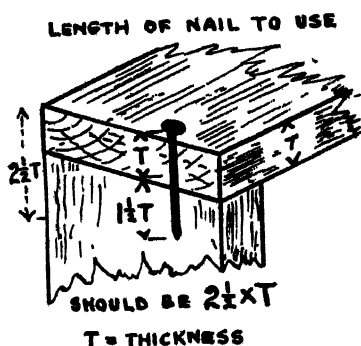
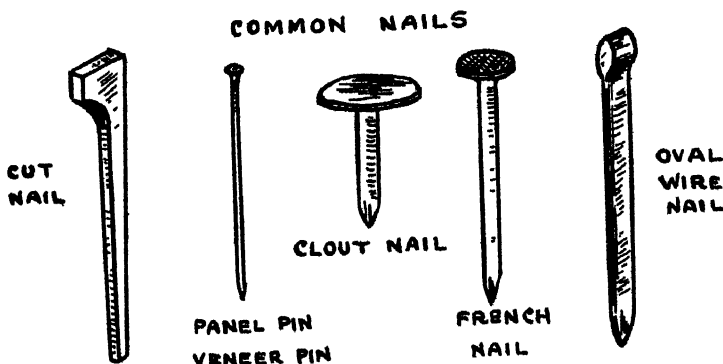
If you are in doubt about the size of nail you should use for a particular job, it is a safe rule to select nails that are two-and-a-half times as long as the thickness of the wood you are nailing. Nails this length will hold securely. The correct distance of the nail from the edge of the wood is a little more than the thickness of the wood. If you drive a nail too near the edge of the wood it will probably split the wood and spoil your work.

When you join the ends of two pieces of wood together by putting one piece on top of the other, you make what is known as a "butt" joint. This is not so strong as a dovetail joint, but you can strengthen the joint by what is known as dovetail nailing. Drive the nails at a sloping angle into the end grain of the wood, but never use French nails for this purpose. When using oval wire nails always drive the nails so that the "long way" of the oval lies in the direction of the grain of the wood.

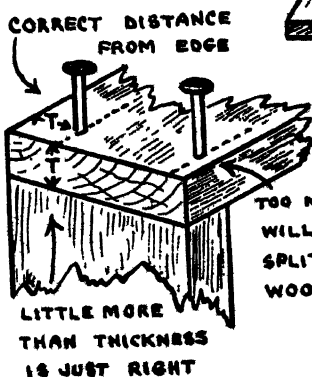
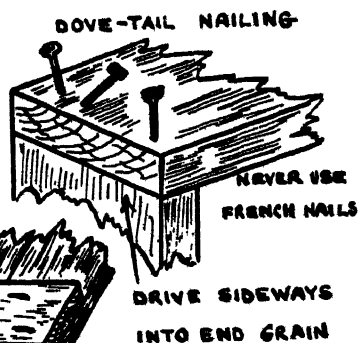
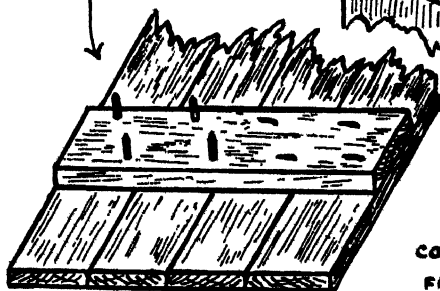
If you want to make a rough door for the garden or for a shed, a battened or cleated door makes a very strong job. The nails are first driven right through the battens that you lay across the lengths of wood. The projecting ends of the nails are then folded down or cleated over with the hammer. The sketch shows you how this is done.

There is one thing we might mention about nailing, and that is, mind you don't hit the wrong nail on the head. It is quite easy to hit your thumb nail, and the result is not at all pleasant.

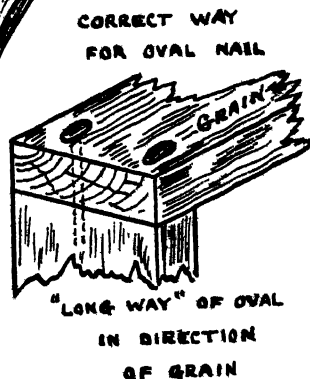
HAMMER AND NAILS



TO MAKE A
BATTENED
OR CLEATED DOOR
KNOCK NAILS THROUGH
THEN CLEAT OVER



A STRONG JOB
BUT DON'T
HIT THE WRONG NAIL



ANIMAL PARADE

HERE is a fine chance to make a few useful toys that any child will greatly appreciate. Get the fretsaw out and look around for discarded pieces of wood. Plywood will suit our purpose beautifully.

Now look through your scrapbook for pictures of funny animals, the more grotesque the better, kangaroos, elephants, camels, monkeys, ducks, pigs, etc. Trace these animal shapes on to odd pieces of wood, or, if you like, paste the picture on the wood just as you did the paper pattern when you were doing fretwork.

Before you begin cutting out, mark in pencil a base at the foot of each animal (*see sketch*). Each animal when cut out is mounted upright on a platform of wood about a quarter to half an inch thick. The base of the animal can be glued securely into a slot cut down the centre of the platform with the fret-saw.

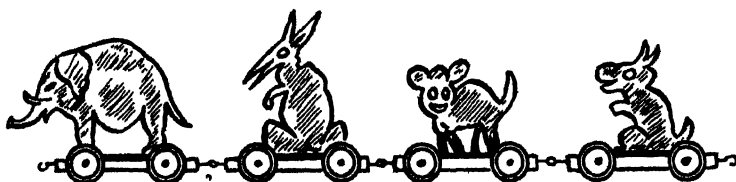
Now we have to mount the platforms on wheels. Each platform will require two strips of wood about half an inch square for axles. Cut these the same width as the platform and nail each axle across about one inch from each end of the platform. Of course, the platforms will vary in size according to the size of the animals, but the construction is the same in each case.

Now for the wheels. In another part of this book there are some ideas concerning the making of wheels. Just look this up and refresh your memory. Cotton reels cut into slices make good wheels, so do the lids of many tin cans. The wheels may be fixed to the strips under each platform by means of large headed nails or screws, but carefully drill a hole for them first and you will not split the wood. Make sure that the wheels turn easily.

Now look the sketches over and get busy. Clean up each finished toy with glass-paper and paint them in bright colours. Fix a small hook at each end of the platforms to link up all the animals and pull them in a long parade round the room. Small holes drilled in each end and joined up with loops of string answer the same purpose.

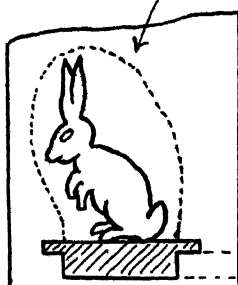
Here is another idea that causes lots of fun. If the wheels are not exactly round the animals rock about in a most fantastic way. Make some of the wheels lop-sided, oval or irregular and try the effect. Still another way is to arrange the hubs of each wheel slightly out of the centre (eccentric). This will also cause the animals to wobble about as you pull them along. If you have no fret-saw there is no reason why you should not cut your animals out of thick cardboard, or even sheet tin.

ANIMAL PARADE



②

DRAW OR PASTE
ANIMAL ON TOP
OF THE BASE



①

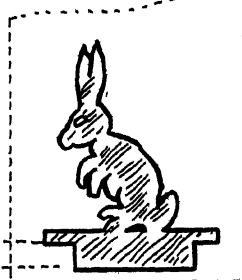
PIECE OF PLYWOOD

BASE FOR ANIMAL
DRAWN ON WOOD



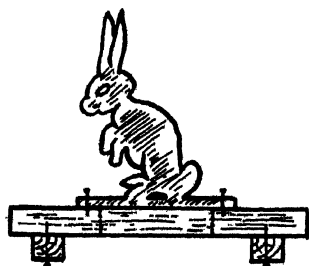
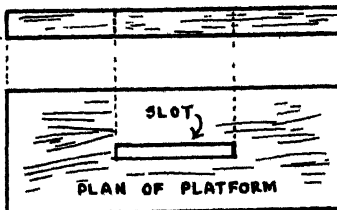
③

CUT OUT ANIMAL
AND BASE IN ONE
PIECE WITH FRETSAW



④

CUT SLOT IN CENTRE OF PLATFORM
TO HOLD BASE OF ANIMAL

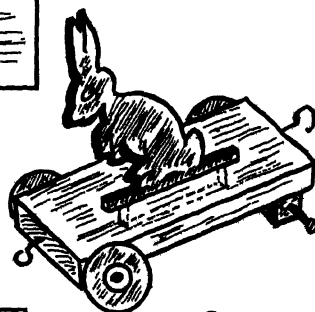
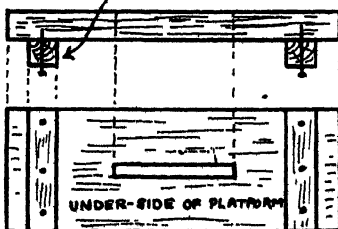


⑥

GLUE ANIMAL SECURELY
IN THE SLOT. FIX EACH
END WITH A SMALL TACK
OR PANEL PIN

⑤

NAIL ON CROSS PIECES
TO TAKE WHEELS



⑦

FIX WHEELS WITH
A NAIL OR SCREW.
PUT SMALL HOOKS
AT EACH END

A HANGING FLOWER BASKET

You will probably find some odd lengths of galvanised wire hanging up in the tool shed ; why not use some to make a hanging flower basket.

Get four pieces of wire about one yard long File one end of each piece to a sharp point and then bend the pointed end into a small semi-circle. Now find a stout piece of wood about nine to ten inches square for the base. Drill four small holes through the base about one inch from each corner Push a wire through each hole, and drive the point of the curved end securely into the wood with a hammer.

Next we require some short lengths of wood about three-quarters to one inch in diameter and ten inches long to form a basket. The wood that is used for trellis work in the garden or stakes that are used for plants will do. But for a real rustic effect why not collect good stout pieces of hazel, ash, willow or beech. If you live in the country this should not be difficult Get pieces as straight as possible and uniform in thickness Cut the ends square and drill holes about one inch from the ends of each piece. Fix the wood in a vice to do this. If you have no drill no doubt you can bore the holes with a gimlet.

Now thread the pieces of wood on the four wires in sets of four (*see sketch*), until the basket is deep enough for your purpose. Make a metal ring to gather in the ends of the wires. Pass each wire through the ring, bend it over at a suitable distance from the basket, secure it with a twist and cut off the surplus end. Be sure that each wire is the same length, otherwise the basket will not hang straight.

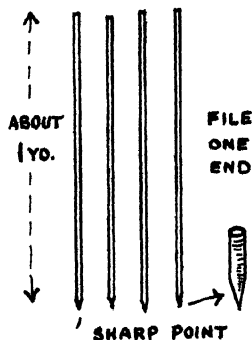
Finally preserve the wood with paint or varnish.

Before you hang up the basket, line the inside with a nice thick nest of moss, then you either put a flower pot in the centre or fill it with mould. Ferns, campanulas, ivy-leaved geraniums or trailing plants grow well and make a good show over the porchway entrance. Do not forget to water the plants regularly.

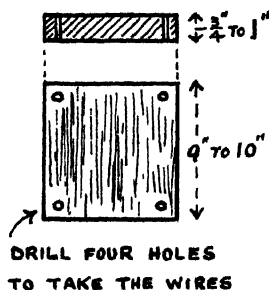
Having made a square basket you might like to see how successful you can be with more artistic shapes. We have sketched a few ideas, but you may have others of your own. You might see how you can get on with a hexagonal or octagonal base.

A HANGING FLOWER BASKET

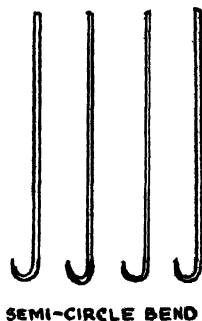
① GALVANIZED WIRE



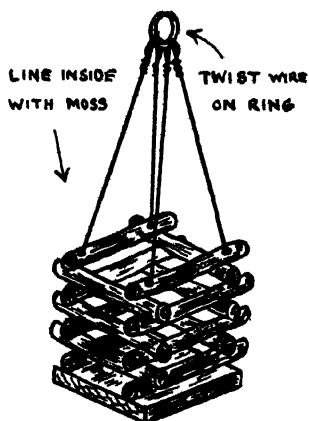
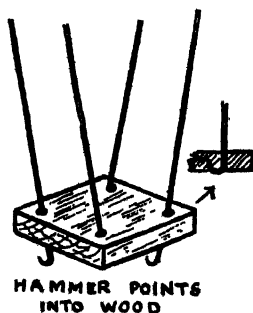
③ STRONG WOOD BASE



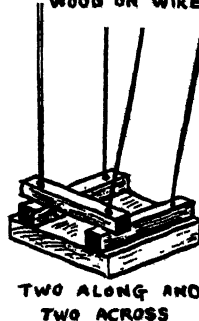
② BEND POINTED END



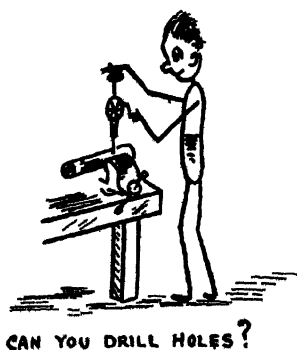
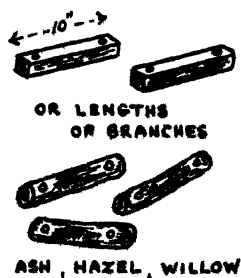
④ PUSH THE WIRES THROUGH BASE



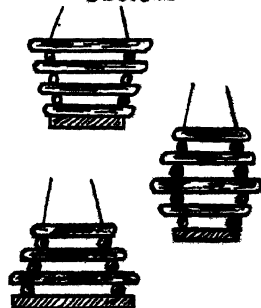
⑥ THREAD LENGTHS OF WOOD ON WIRES



⑤ CUT LENGTHS OF WOOD AND DRILL HOLES



TRY SOME OTHER DESIGNS



A GOODS TRAIN

YOUNG children always enjoy playing with trains. Let us build a goods train that will give some youngster many hours of delight. If it is strongly built it will stand a great amount of hard wear without falling to pieces.

Apart from the boiler, which requires a piece of wood three inches square and seven inches long, the rest can be made with pieces of box-wood obtained from the grocer's store for a few coppers, odd pieces of tin for bearings, some strong galvanised wire for axles, nails, panel pins, carpet tacks, wheels, and a few screw-in eyes and hooks.

Start work on the engine by making the *base* or bed with a piece of wood fifteen inches long, four inches wide and half an inch thick. Now cut out six pieces of tin as shown in the sketch. Drill holes for screws and axles and fold the tin at right angles ready for screwing on the underside of the base. Cut lengths of wire for the axles and then look up page 116 for the method of making and fixing wheels. If you prefer it, you can fix the wheels to strips of wood nailed under the base, as shown on page 85.

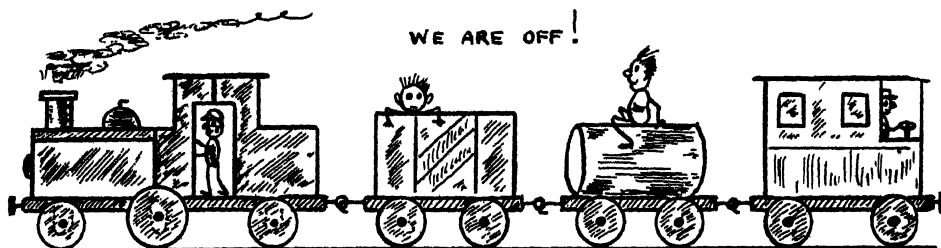
Now turn to the boiler. You may prefer a round one, but we suggest a piece of wood three inches square and seven inches long with the two top edges planed down as shown. Nail this firmly to the base, leaving half an inch space in front and at each side. Next we require some pieces of wood about a quarter of an inch thick for the cab and coal bunker. Cut out two pieces 5 in. by 3 in. for the front and back of the cab. Drill two look-out holes in the front piece, and a coal-hole in the back piece. Next, four pieces of quarter-inch wood are required for the sides of the cab, two 5 in. by 3 in. and two 5 in. by 5 in. Cut them to the shapes shown in the sketch. Finally, a piece 4 in. by 5 in. for the top of the cab, and a piece 3 in. by 3 in. for the end of the coal bunker.

Now assemble the pieces and nail them in position with panel pins. Start with the front of the cab, then the two front sides, making them overlap the boiler by one inch. The rest is easy to follow.

The funnel and the safety valve is made out of a cotton reel. Round one end with a knife or spokeshave, as shown, and then saw the reel into halves. Fix each half with a long nail down the centre hole. Flat brass carpet tacks make good buffers, and screw hooks and eyes are splendid for linking up the trucks.

If you have been successful in building the engine you will have no difficulty in making trucks, milk vans, oil tankers, and guard's van to your own design. Finish the job with a coat of paint.

A GOODS TRAIN



TIN BEARINGS

$\frac{3}{4} \times \frac{1}{2} \times \frac{1}{4}$

$\frac{1}{2}$ "

HOLES FOR SCREWS

VARY WITH
SIZE OF
WHEEL

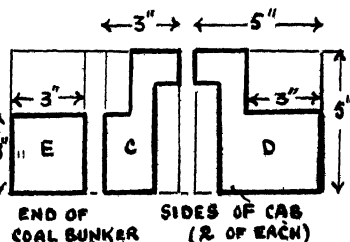
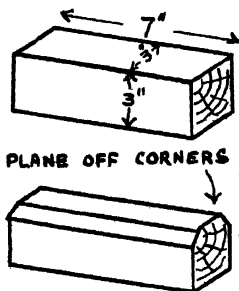
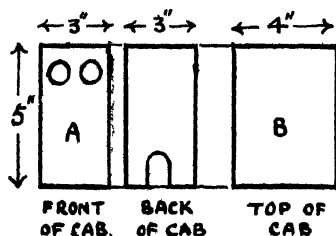
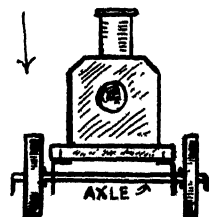
BEND
AT
RIGHT ANGLES

HOLE
FOR AXLE

UNDERSIDE OF BASE OR BED
OF ENGINE

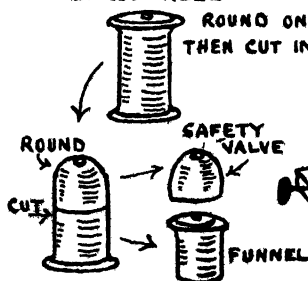
15" SCREW ON BEARINGS

END VIEW OF
AXLE AND WHEELS

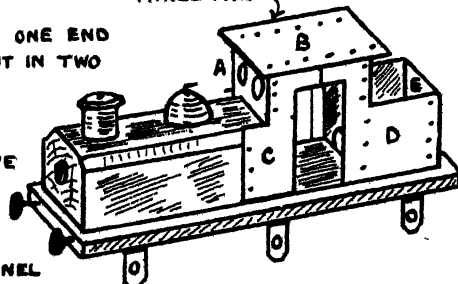


LARGE REEL

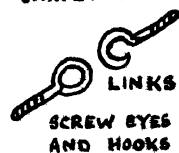
ROUND ONE END
THEN CUT IN TWO



PANEL PINS



BUFFERS



DOLL'S FURNITURE

MAKING doll's furniture is great fun. Get some pieces of wood about half an inch thick, some strips of wood half an inch square section and panel pins about one-and-a-quarter inches long

To make a *chair* cut out a piece of wood about two-and-a-quarter inches square. From each corner cut out very carefully a piece half an inch each way. This makes the seat of the chair (*see sketch*). Now cut up the half-inch square strips for the front legs, back legs, and the rails. Try out the lengths you are going to have before you start cutting.

You will find the mitre block or sawing block most useful for cutting equal lengths of wood. Just nail a "stop" the right distance from the cutting place, then all you have to do is to push up your wood to the stop and saw off equal lengths.

Nail the parts of the chair together with panel pins as shown in the sketch, and when finished give it a coat of oak varnish stain. A piece of coloured material glued over the seat improves the appearance.

The *Table* is made in the same manner as the chair by omitting the extra lengths for the back. It looks best if you add a top of plywood, which should be left unstained

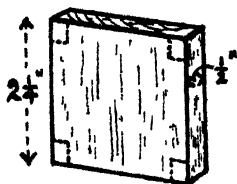
Look at the sketches of the *Settee* and you will have no difficulty in cutting out pieces of wood the right shape. Of course you can vary the design to suit your own taste, but you will find that simple shapes are best. Use fairly thick wood, and when you nail together leave a quarter-of an inch space between the bottom of the back, and the back edge of the seat. This will allow you to push a piece of cloth or other material through if you decide to cover the settee.

Before putting on the cover, pad the seat and back by gluing on pieces of cotton wool. Then cover with pieces of cretonne or other material. The material can be glued to the edges of the wood and stretched over the wool padding, or it can be fixed with small brass tacks. Finally, a piece of braid glued over the edges hides the joins.

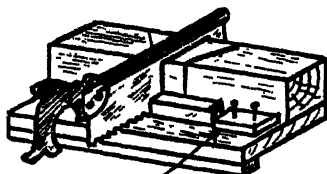
Easy Chairs are made in the same way as settees, except that they vary in the length of the seat and shape of the back. Those in the sketches look very comfortable, and are restful.

DOLL'S FURNITURE

WOOD FOR SEAT

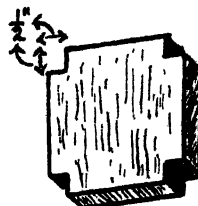


CUTTING EQUAL LENGTHS

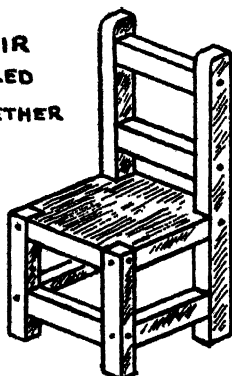


NAIL A STOP ON BLOCK

CUT AWAY CORNERS



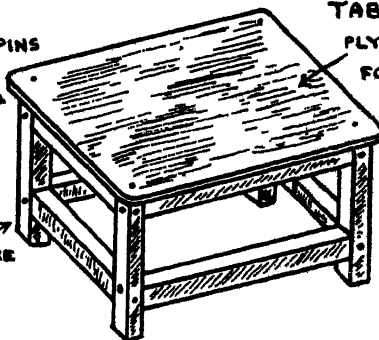
CHAIR
NAILED
TOGETHER



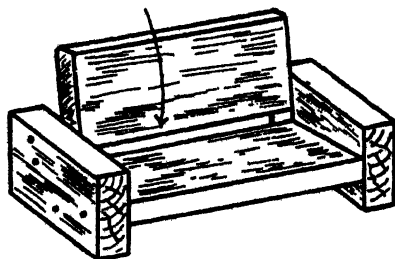
PANEL PINS

1/2" SQUARE

TABLE
PLYWOOD
FOR TOP

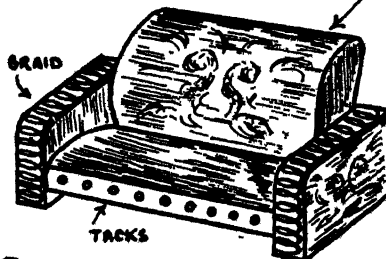


LEAVE 1/4" SPACE TO
GET MATERIAL THROUGH

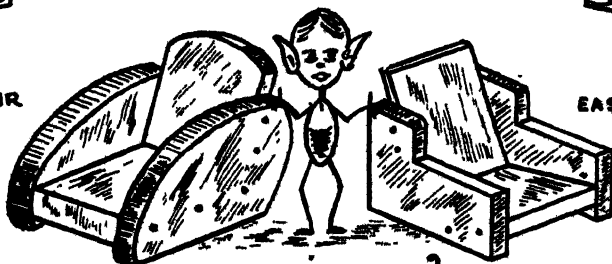


SETTEE

PAD WITH COTTON WOOL
AND COVER WITH CRETONNE



EASY CHAIR



EASY CHAIR

WHICH WILL YOU TRY?

A SPY GLASS OR KALEIDOSCOPE

GET a glazier or someone with a glass-cutter to cut three strips of mirror for you, each piece six inches long and one inch wide. Now arrange them with their edges overlapping (and mirrors facing inwards) in the form of a triangle. Secure them in this position with elastic bands or binding strips.

Next get a piece of cardboard and draw a triangular jacket to fit round them. Each side will be six inches long, and a little more than one inch wide (*see sketch*). The actual width will depend upon the thickness of the glass. Have a triangular top piece with a round peep-hole in the centre, but leave the bottom open so that the light is reflected up the tube. Cut out the shape, score the thin lines and fold the cardboard round the mirrors. Next bind all the edges with binding strips, and fold the strips under the bottom edges so that they grip the mirrors inside. This will keep them in position.

Now we require a stand. The sketches show you a simple way to construct one in wood, but there is no reason why you should not make one with strong wire or by some other method. The main thing is to make sure that the upright is quite rigid and does not wobble about. Glue the dowel rod or wood skewer securely into the holes in the upper and lower pieces of wood.

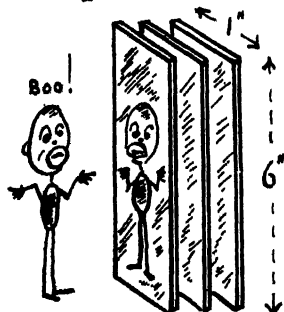
The kaleidoscope is held to the stand by means of rubber bands. You can raise or lower it until you have the best position to see the patterns clearly.

The articles you are going to look at are placed on a round disc of white cardboard. This is fixed on the base by means of a pin or small nail, so that every time you turn it round the designs change. To fix the pin, look down the kaleidoscope and move it about until it is centred properly. Now we are ready to have a peep.

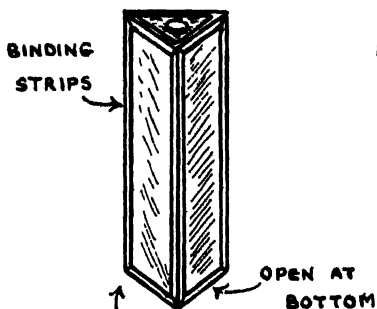
Place the spy glass so that bright light falls on the disc, then sprinkle the disc with small pieces of coloured paper, glass, coloured tinfoil or any other coloured articles you like. Look down the peep-hole and you will be delighted with the wonderful designs they make—every time you give the disc a twist a new pattern comes into view. Just try and see if you can get the same design twice.

SPY GLASS OR KALEIDOSCOPE

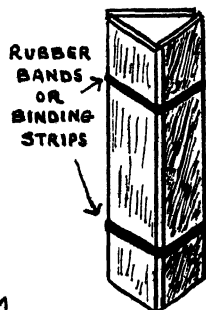
THREE PIECES OF
LOOKING GLASS



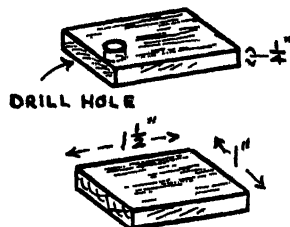
PUT MIRRORS IN A
CARDBOARD JACKET



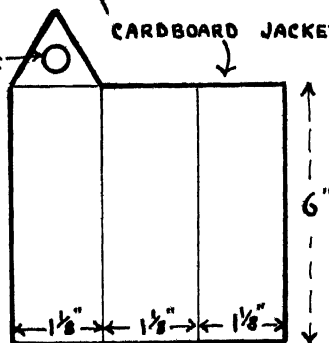
FIX IN A TRIANGLE
MIRRORS INSIDE



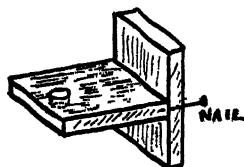
TWO PIECES
OF WOOD



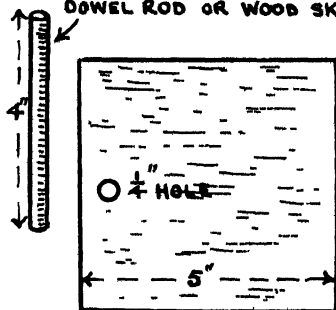
PEEP HOLE
CARDBOARD JACKET



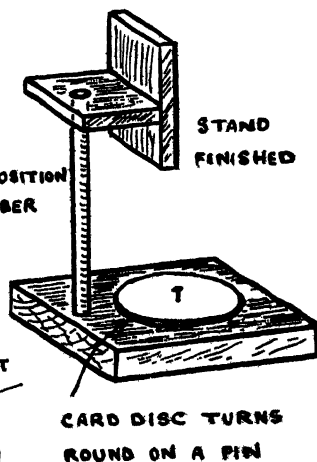
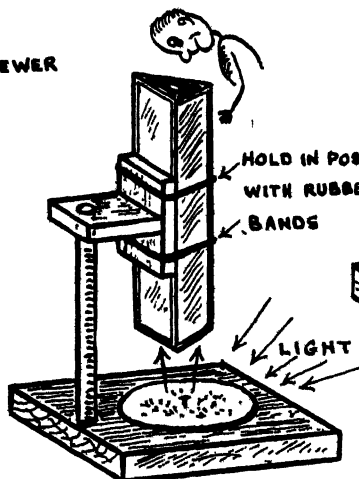
NAIL OR SCREW
AT RIGHT ANGLES



DOWEL ROD OR WOOD SKEWER



SQUARE BASE
1/2" THICK



USING MATCH BOXES

DON'T throw away empty matchboxes, for they can be put to many useful purposes

To make a *Nest of Drawers*, glue or seccotine the outer cases together and then cover the top, sides and back with strong paper. A boot button on each inner case makes a useful knob for pulling the drawer open. Make a slit in the front of the drawer, push the metal eyelet through and fix it inside with a small piece of wood or wire. Small articles such as tacks, buttons, screws, drawing pins, nibs, panel pins, etc., can be stored in the nest of drawers, and it is a good idea to label each drawer so that you know what it contains.

Now take a look at the sketches and you will see how easy it is to make really first-class dolls' furniture with match boxes. The *Writing Desk* is just a nest of drawers made with seven boxes, leaving a well in the centre. For feet you can glue on beads, buttons, pieces of wood or cork. Cover the top with a piece of leather from an old glove and make a small blotting-pad—and there you are

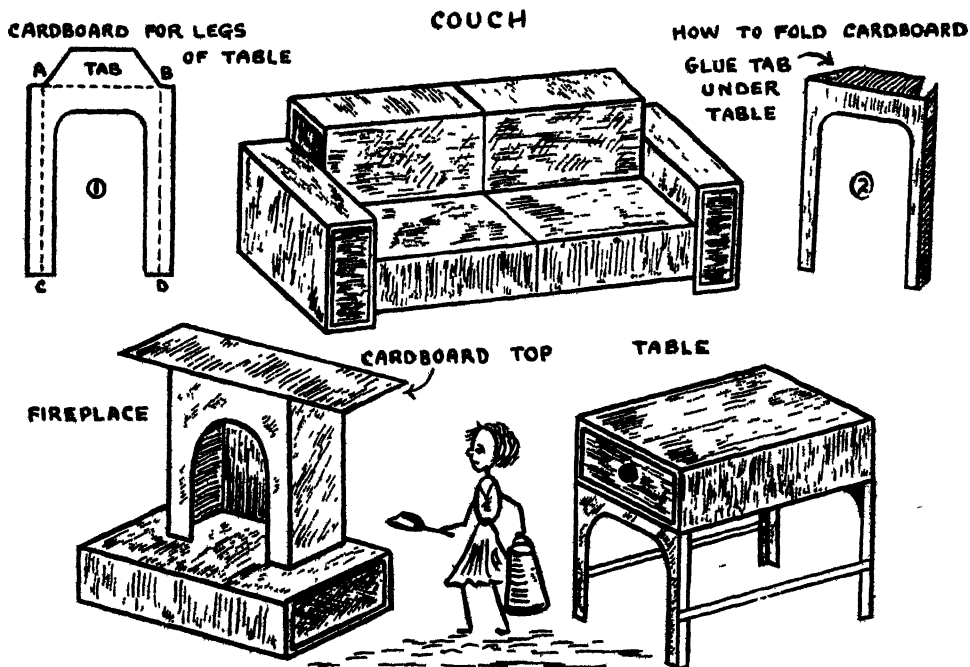
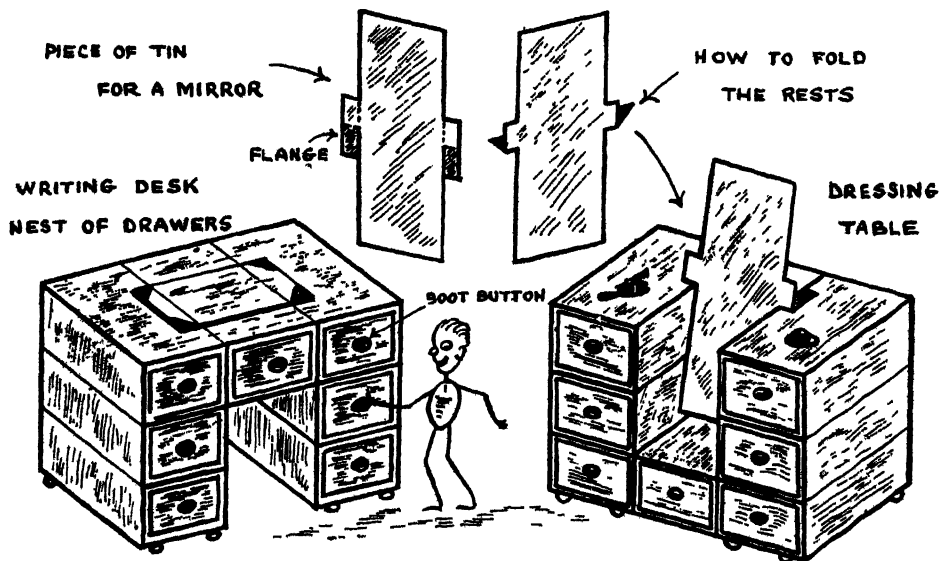
The *Dressing Table* is the desk turned upside down, and only needs a mirror to complete it. A piece of bright tin makes a good mirror. Cut a rectangular piece of tin with a small flange on each side (*see sketch*). Now cut half-way along each flange and bend the cut portions at right-angles. The bends will make the *rests* for holding the mirror upright on the table.

A *Couch* is easily made with six match boxes, or it can be done with four if you use two boxes for the seat. Cut away the lower part of the sides of the boxes that form the back of the couch, then slide two boxes for the seat into the gaps. Glue the boxes together and cover with some material to suit your fancy.

The *Fireplace* needs no explanation. Just cut out the shape of the fireplace in one box and glue it to the other which makes the hearth. A strip of cardboard will do for the shelf.

The *Table* is easy to make except for the legs. One method is to make the legs of stout cardboard, as shown in the sketch. Cut out a piece of cardboard (*see sketch* (1)). Next score the lines AB, AC, BD and bend them back as shown in sketch (2). Finally glue the tab under the table. You can add side rails as a further support for the legs. If you have a fret-saw and some plywood you might cut out the legs in wood and make a still stronger job of it.

USING MATCH BOXES



MORE MATCH BOX FURNITURE

ON the previous page we introduced a few articles that can be easily made with matchboxes. Girls especially will be keen to furnish a doll's house completely.

Start with a *Cradle*. If you cut away one side of the outer cover of a matchbox the drawer will then slide in for the bed and may be glued into position. Two strips of cardboard make excellent rockers. Cut the shape as shown, then score and bend down the middle piece or tab. Glue the tabs on the bottom of the cradle, and there is your rocker complete. Of course you will add a valance and furnish the cradle to suit your own taste.

A *Kitchen Sink* is quite an easy affair. Just fix the drawer of one box on top of two outer covers and secure the ends with strips of gummed paper.

The *Sideboard* may be made by gluing together three matchboxes. For the back you can cut a piece of cardboard, or plywood if you wish, to any design you fancy. The legs, too, can be cut out of cardboard and glued with tabs under the end boxes in the same way as we did for the table on page 94.

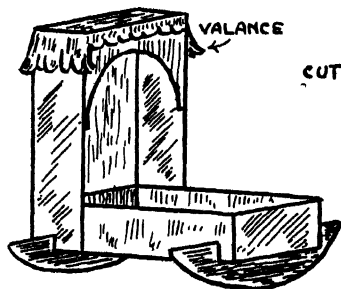
If you have already made a couch you will have no difficulty with an *Easy Chair*. It is made in exactly the same way except that one box is required for the seat and back instead of two.

To make a matchbox suitable for the seat of a *Kitchen Chair* a little cutting away is necessary. Matchboxes are about two-and-a-quarter inches long and one-and-a-half inches wide. Therefore, to get a square seat you must cut about three-quarters of an inch from the length of the box. If you do this carefully with a sharp knife the box will keep its shape. The drawer can be cut down by taking a piece out of the centre. The two end pieces can then be pushed in to fit the shortened cover. The back and legs can be cut out of cardboard, as previously explained.

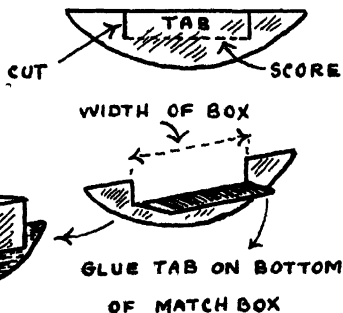
If you cut out carefully the sides of the outer covers you can sew them together with loops of thread in about four places. This makes a very useful *Screen* to stand up near the door or round the fire.

MATCH BOX FURNITURE

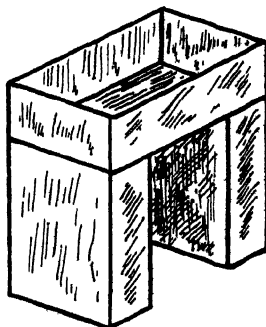
BABY'S COT



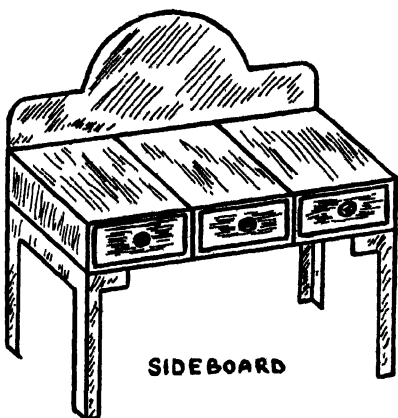
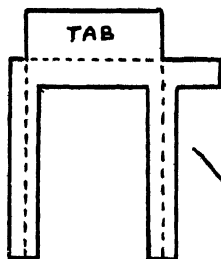
ROCKER MADE OF CARDBOARD



KITCHEN SINK



CARDBOARD FOR LEGS

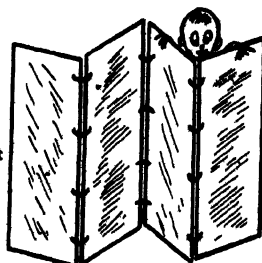
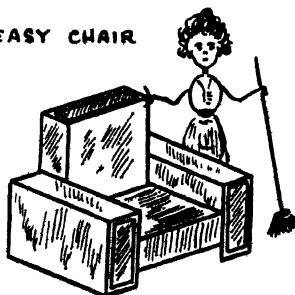


READY FOR FIXING



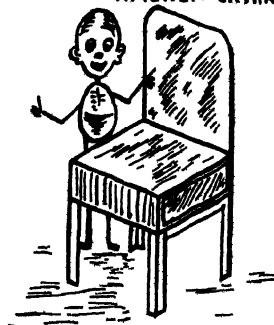
SIDEBOARD

EASY CHAIR



SCREEN

KITCHEN CHAIR



A DOLL'S HOUSE

MAKING a doll's house is great fun. Try it. We made one out of an empty box that we got from the grocer. The box was fifteen inches high, nine inches deep and twenty-four inches long. We did the fitting with plywood, but wood from lids and sides of boxes will do almost as well. The sections are made separately and afterwards nailed into position. It does not matter if your box is not the same size as ours. Follow the sketches and make measurements to suit your own box. The main idea is to see that each section is a good fit.

Start with the two upright partitions and cut the wood so that it just slides into the box. Draw a line across the middle of the box to mark the position of the upstairs floor, and also cut out two pieces for the house front. If you propose to open and shut the house, glue on pieces of tape for hinges. Next nail the floor to the partitions in a horizontal position with one-inch panel pins. Your line will tell you where to drive the nails.

Now make the support for the roof in the same way. Follow the drawing carefully. When finished stand the roof support on top of the box, and cut two pieces of wood the right length for the sloping roof.

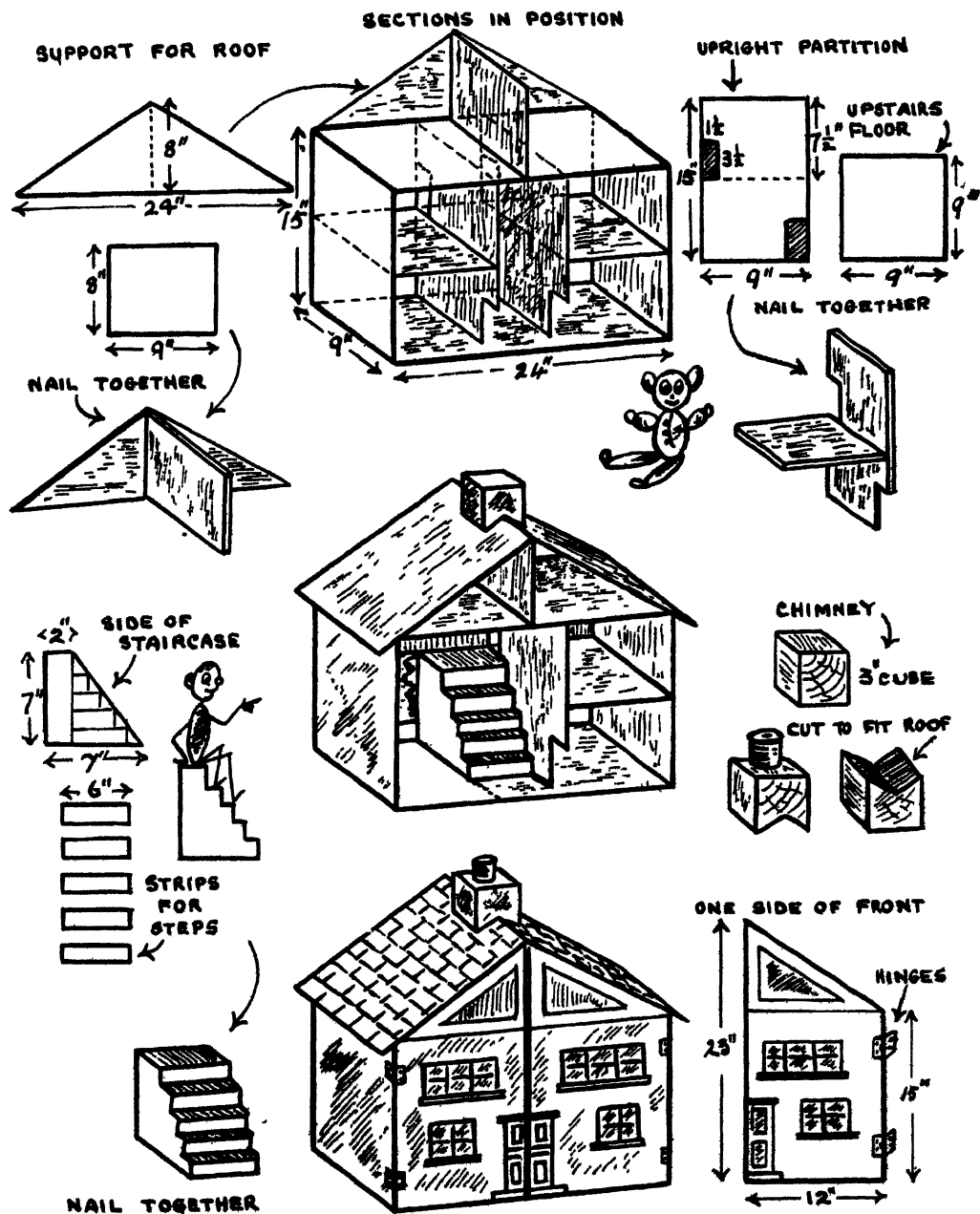
The next job is the staircase. Cut two pieces of wood as shown in the sketch, allowing two inches for the top landing. Now draw a number of parallel lines about one inch apart down the sloping sides and mark in the steps. Cut these out carefully. Next prepare a number of strips of wood for the steps, nail them in position and make a strong job of it.

The chimney is made out of a block of wood three inches square, one side being cut into a groove to fit the roof. This can be glued to the roof, and a small cotton reel for a chimney pot gives the finishing touch.

When all sections are complete the interesting work of nailing them into position begins. Carefully mark around the box the places where the nails are to go and you will find that it will help you to drive them into the centre of the wood. Fit up the rooms first and put the roof on last.

The front of the house is made in two pieces with hinges at the side so that it can be opened up. The windows, door and painting of the house you will do to your own taste. If you cut out the window spaces and glue in pieces of cellophane it will give the appearance of real glass when lighted up at night.

A DOLL'S HOUSE



LIGHTING A DOLL'S HOUSE

HAVE you ever taken an electric torch to pieces to see how it works? The sketch (No. 1) opposite gives you the idea. By using a similar circuit it is quite easy to light up all the rooms in a doll's house. You need a dry battery, some thin copper wire, brass drawing pins and small electric bulbs. Look carefully at sketch No. 2 and you will see how it is possible to light up as many bulbs as you like from one battery. This method is known as lighting in parallel.

Two *main* wires run from the battery and each one has an open end. The circuit is made by joining cross wires from one main wire to the other. Each *cross* wire is cut in two separate places. In one cut you fix a bulb, in the other you fix a switch. You can buy holders for the bulbs and small switches for putting the light on and off very cheaply. If you can afford these, wiring up is very easy, but if you are hard up you can manage without either by following sketches No. 3 and No. 4.

Let us wire up one room, then you will be able to do the others in exactly the same way. Put a battery at one end of the roof of the doll's house, solder a wire to each terminal, run one wire straight along the front and the other along the back of the roof. Fix them down with drawing pins. Now fix an electric bulb in the ceiling either with a holder or in the manner shown in sketch No. 3. Connect one terminal to the back main wire (sketch No. 5) and take a wire from the other terminal along the ceiling and down the wall to the switch. From the other terminal of the switch bring a wire back to the main front wire of the roof.

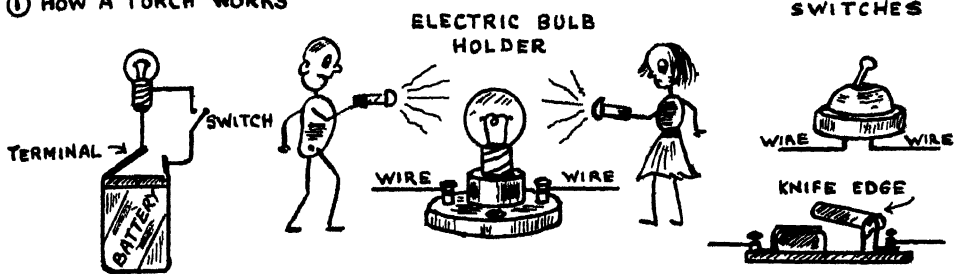
Follow the same plan for all the other rooms, and the lights will appear as you put in the switches.

You can make connections by twisting the wires tightly together, but soldering them is best. For fixing the wires along walls and ceilings twist them round brass drawing pins which have been stuck in convenient places. This keeps the wires from touching one another and makes a neat job. Use covered or insulated wire, but don't forget to bare the wire every time you make a connection.

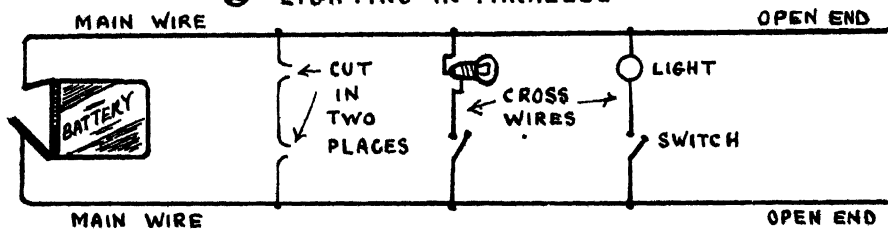
Now if you want to light up your study, bedroom, tool shed or coal cupboard you should know how to set about it.

LIGHTING A DOLL'S HOUSE

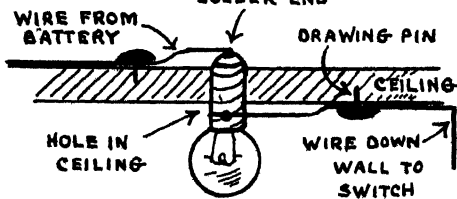
① HOW A TORCH WORKS



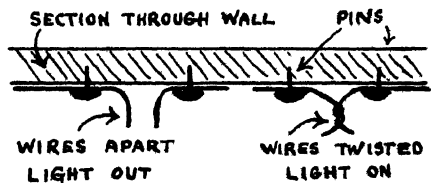
② LIGHTING IN PARALLEL



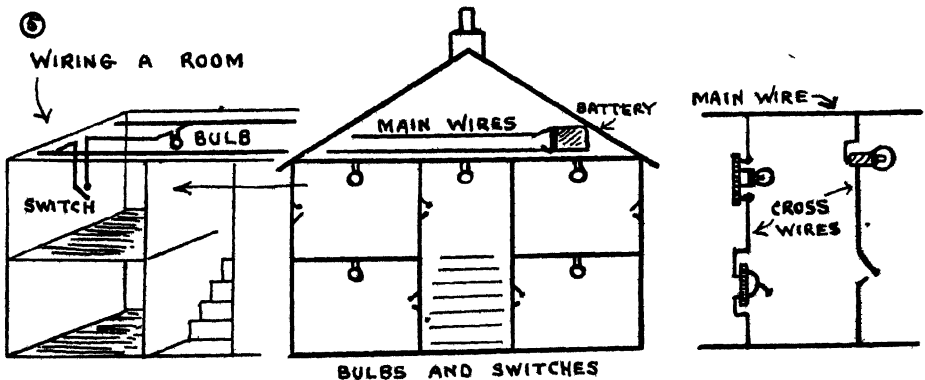
③ SOLDER END



④ A SIMPLE SWITCH



⑤ WIRING A ROOM



METALWORK TOOLS

VERY often a broken utensil in the home is thrown on one side when, with a little knowledge of metalwork, it could be repaired and put into use once more. A loose handle only needs a rivet, a tiny leak in the kettle needs stopping, the dustpan is bent or twisted, and a simple job of soldering would often put the matter right.

Perhaps you would like to make Mother a tin sugar scoop, or a pastry-cutter, and there are tin toys that you would like to make for your own pleasure. Metalwork is lots of fun, but the amount that can be done at home is limited to the number of tools you have got. If you are keen it is surprising how soon you can collect useful tools and learn how to use them correctly.

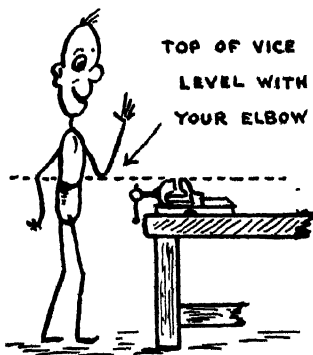
First you should have a vice. The bigger and heavier it is the better, provided you have a strong bench or table on which to mount it. Notice in the sketch that the correct height of the vice is level with your elbow. Then you will require an engineer's hammer with a head about half a pound in weight, and some cutting or general pliers. For cutting sheet metal you will need a pair of tinman's snips—size ten-inch or eight-inch will do. Keep the snips for cutting metal only; it spoils them if you use them to cut wire.

You will want to drill some holes and will need a hand-driller and some drills. Drills can be bought very cheaply, but the cheapest ones will not do for very hard metal. Files are very important. You can manage with two or three for a start, but you will find it worth while to keep on collecting until you have a good assortment of shapes and sizes. A useful set would include a ten-inch hand flat with a safe edge, and a ten-inch half round, both of them second cut. Half a dozen six-inch assorted smooth cut files of the shapes shown in the sketch would complete your requirements. You will find a hack-saw a very useful tool and no kit is complete without it. For soldering you should get a soldering bit with about half-pound head. This is fairly heavy but will hold the heat well and enable you to complete a job without a lot of re-heating of the iron.

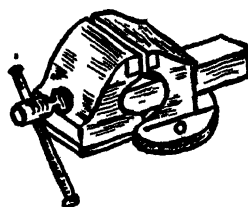
Now don't be alarmed at this list and think that it is going to run you into a lot of expense. Many people have odd tools lying around that they never use but which are just the tools you want. Show your friends how keen you are to do a job for them and they will probably give you these tools or sell them for a few coppers.

METALWORK TOOLS

CORRECT HEIGHT OF BENCH



PARALLEL VICE



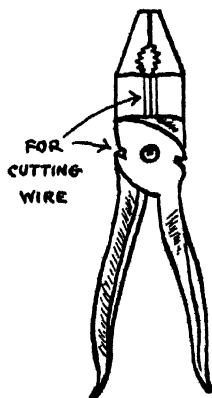
TINMAN'S SNIPS



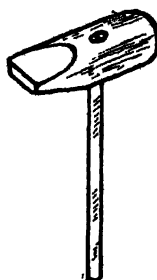
SOLDERING IRON



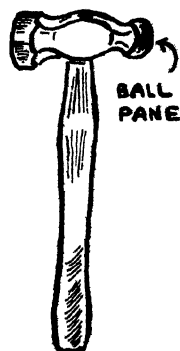
PLIERS



MALLET



ENGINEER'S HAMMER



HAND FLAT FILE



SHAPES OF FILES

TRIANGULAR



SQUARE



FLAT



HALF-ROUND



RAT TAIL



KNIFE-EDGE



HOME-MADE TOOLS— MAKING A SEAM

Now for a few tools that we can improvise and make for ourselves. Tinman's stakes and anvils are very expensive, but an ordinary flat iron makes an excellent tinman's anvil when it is turned upside down. It can be fixed in the vice or you can cut a slot in the bench top for the handle of the flat iron to fit into.

Instead of a bick iron or ring stake you can use pieces of iron piping or shafting. You will require these to round off some of your metal. Keep odd pieces of different sizes under your bench.

You will want to punch some holes. Very good punches can be made with different nails of various sizes. First file down their points and then slightly taper the flattened ends. A small wood mallet can be made in the following way. Saw four inches off the end of an *ash* broom handle to form the head of the mallet. Now round off one end of the head and make a blunt wedge of the other. Next drill a hole through the centre of the head and drive in a handle—use a five-eighths-inch dowel rod, which makes an excellent handle.

Now you will require a few pieces of hard wood—oak is best.

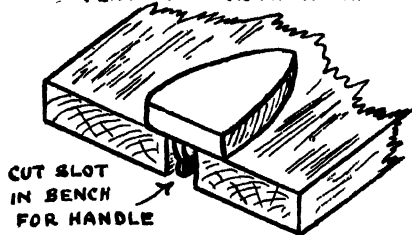
These should be planed up nicely so that their faces are square to each other. For making seams and bends fix your metal between two pieces of wood, and when you want to punch a hole, place the metal on a piece of hard wood first.

Lastly make yourself a strong tool box. Untidy people leave their tools all over the bench and lose them. If you are going to be a good workman pack up when you are finished and leave a clean bench. Don't leave this job for others to do.

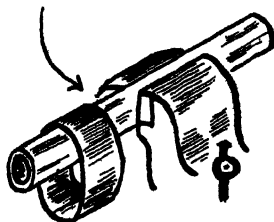
Now we are ready to make a seam. Take a flat piece of tin and draw two pencil lines a quarter of an inch from each edge (*see sketch*). Sandwich the tin between two pieces of wood so that the quarter-inch strip is just above the wood. Fix this in the vice and gently fold the edge over with the mallet. Turn the tin round and bend the other edge in the opposite direction. Now use a steel ruler or a thin piece of metal to close the strips down with your mallet. Next fix a piece of piping in the vice and gently bend the tin round it until the two strips easily fit together. Finally close the seam by gently tapping along it with the mallet.

HOME-MADE TOOLS - MAKING A SEAM

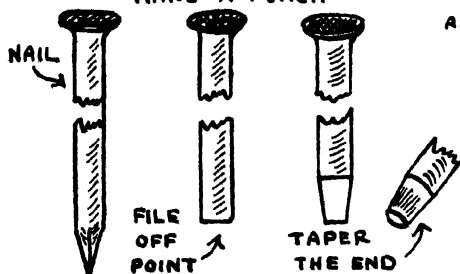
FLAT IRON FOR AN ANVIL



PIPE FOR A RING STAKE

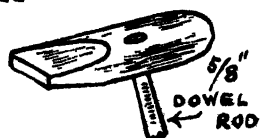


MAKE A PUNCH

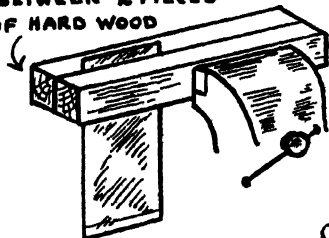


MAKE A Mallet

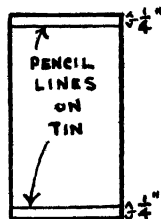
ASH BROOM HANDLE



② SANDWICH BETWEEN 2 PIECES OF HARD WOOD

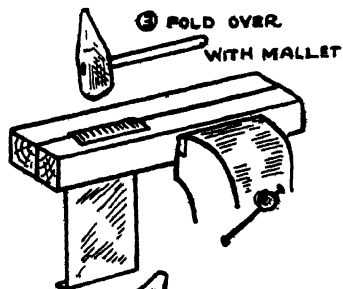
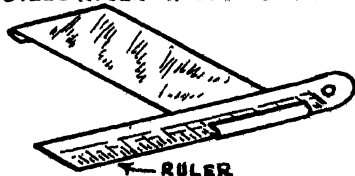


MAKING A SEAM

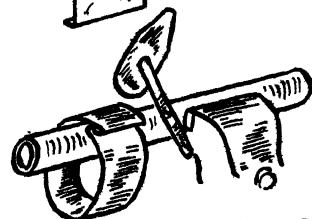


① MARK OUT METAL

③ CLOSE FOLDS DOWN ON A STEEL RULER OR STRIP OF METAL



FINISHED



BEND OVER PIPE - JOIN ENDS CLOSE WITH Mallet

SOLDERING

Cleanliness. The first rule is that the copper bit and all the surface to be soldered must be perfectly clean. The air quickly covers metal surfaces, especially hot ones, with a film of oxide on which the solder will not flow. Therefore, before soldering, the cleaned surfaces should be covered with a thin coating of flux to prevent the oxides forming whilst the soldering is being done.

Flux. There are many kinds of flux, such as soldering paste, "killed spirits," resin, tallow. For general work the first two are best. Buy a tin of flux or make your own "killed spirits." To do this put some hydrochloric acid (spirits of salt) in a jam jar and drop in small pieces of zinc (from an old dry battery) until no more zinc will dissolve. Do this in the open air and don't put any lighted match to the gas which is given off or it may explode. When the fizzy action is over drain off all the clear liquid into a bottle and use a little at a time when soldering.

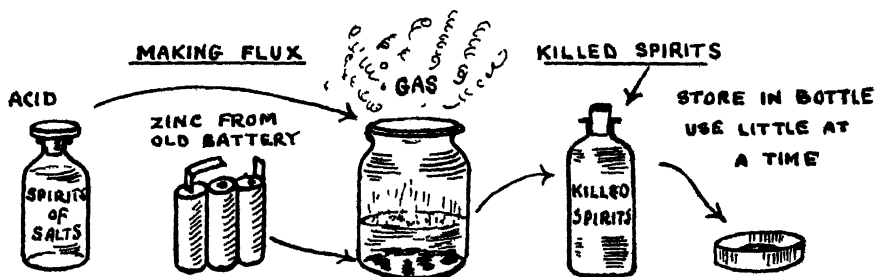
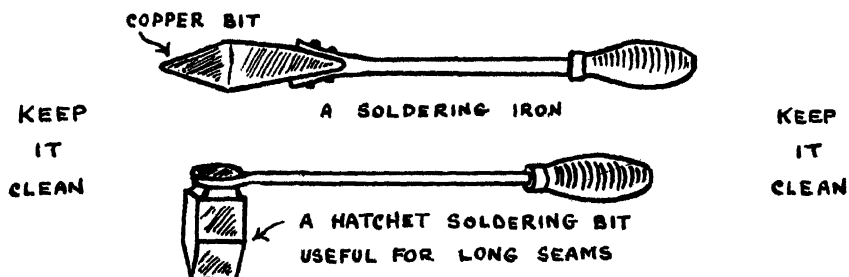
Solder. The soft solder used for joining metals together is a mixture of 50 per cent. tin and 50 per cent. lead. It can usually be bought in bars and wire form from an ironmonger.

Heating the soldering bit. A gas ring is probably the most convenient method. A coal fire is no good because the sulphur in the coal combines with the copper end of the bit and renders it useless. Make the iron quite hot, but not red hot. It should sizzle and give off a little steam when put in the flux, but it should not send up volumes of steam. It should melt the solder at once to a bright silvery colour. The solder should always run freely. As soon as it begins to get pasty and dull your iron is not hot enough.

Tinning the soldering bit. Since the copper oxidises so quickly the soldering bit will not pick up the solder unless it is tinned—that is, unless the end of the bit is well coated with solder. A new bit requires tinning before use, and when in use it will be found necessary to re-tin it from time to time.

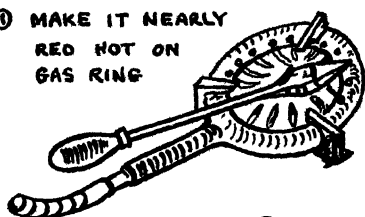
To tin a new soldering bit, first heat it to almost red heat. Then quickly file all the surfaces of the point of the bit with an old flat file. Next dip the bright end of the bit into the flux and then place the end in solder until it is tinned all over. You can put a piece of solder into a small tin lid. The solder quickly melts and covers the clean surfaces of the bit. Your iron is now ready for use. If you rub the tinned bit from time to time with a piece of cloth that has been dipped in powdered sal ammoniac it will not require re-tinning for some time.

SOLDERING ~ TINNING THE BIT

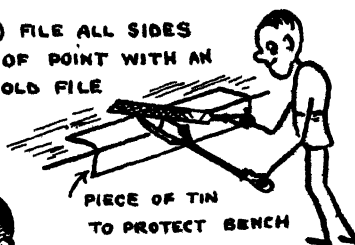


TINNING THE BIT

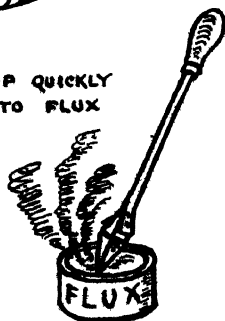
- ① MAKE IT NEARLY
RED HOT ON
GAS RING



- ② FILE ALL SIDES
OF POINT WITH AN
OLD FILE

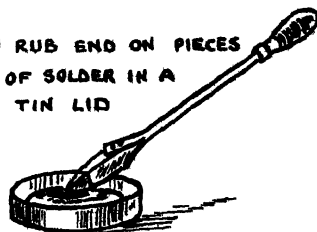


- ③ DIP QUICKLY
INTO FLUX



NICELY
TINNED

- ④ RUB END ON PIECES
OF SOLDER IN A
TIN LID



A SOLDERING JOB

GETTING your tools together has been great fun, the actual tinning of the bit for the first time was exciting; now you are anxious to get down to the real business and make something. We don't want you to spoil the first job and give it up in despair, hence we suggest that you practise soldering with odd pieces of tin plate until you have got the knack.

Look at the sketches and you will see a few simple exercises that are very useful. First make sure that the surfaces to be soldered are quite clean, then cover them with a thin coat of flux. Use a match stick for spreading the paste, but if you prefer "killed spirits," use a small brush or a feather.

The first exercise is a lap seam. Have some small pieces of solder ready in a tin lid. Then take two pieces of tin and lay an edge of one piece about a quarter of an inch over an edge of the other. Coat the edges with flux. Heat the soldering bit until it is quite hot; rub the end with the cloth; dip it quickly into the flux and then pick up as much solder as it will hold from the tin lid.

Hold the two pieces of metal in position with pliers and lay the point of the bit alongside the joint and leave it there for a while to heat up the metal. Now move the point of the bit very slowly along the joint and the glistening solder will flow in and over the joint, the copper bit heating up the metal as it travels. In the finished job the solder should look smooth and clean. Always hold the copper bit well down into the work so that the heat can flow from the copper into the metal. If you use the point of the bit for long seams you will find it difficult to get the material hot enough for the solder to flow. If the solder becomes pasty before you have finished, re-heat the bit. Hold the material in position with the pliers until the solder goes dull and sets firm.

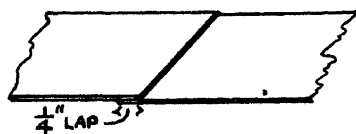
The next exercise is to bend a handle and solder the laps to a flat piece of tin. If you find it difficult to carry enough solder on the bit for the work in hand lay a small piece (snippet) of solder along the joint before applying the bit. The sketch shows you how to make snippets of solder by flattening the end of a bar of solder and cutting strips with the snips.

The third exercise is a corner lap (*see sketch*). Hold the material in position with the pliers and solder both inside and outside.

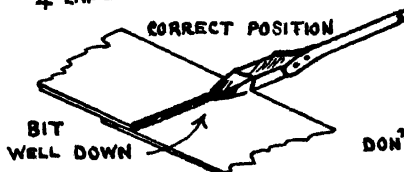
Now try out a few ideas of your own with odd bits of tin—but mind you don't burn your fingers. It isn't always the heavy things that you drop quickly.

A JOB OF SOLDERING

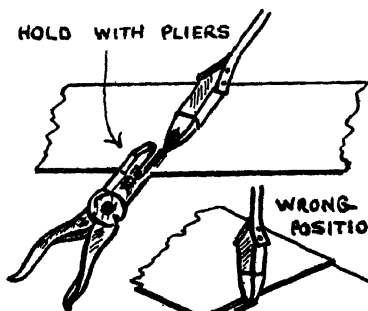
① A LAP SEAM



EDGES
OVERLAP
ABOUT $\frac{1}{4}$ "

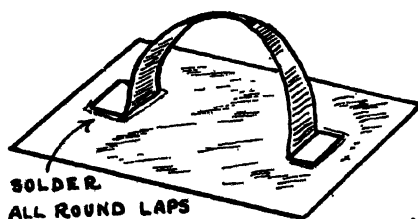


HOLD WITH PLIERS



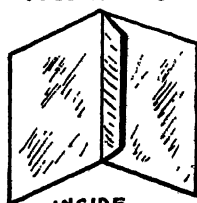
DON'T HOLD BIT TOO UPRIGHT

② A HANDLE

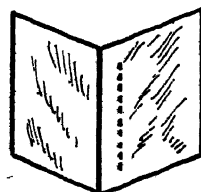


③ A CORNER LAP

HOLD IN POSITION WITH PLIERS

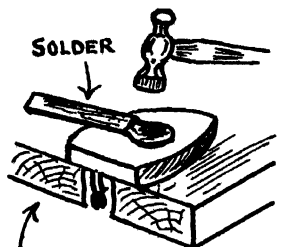


INSIDE

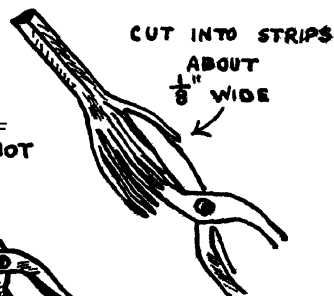
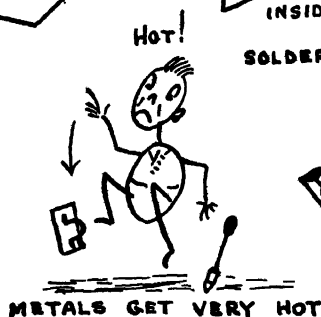


OUTSIDE

SOLDER ON BOTH SIDES



FLATTEN END OF A
BAR OF SOLDER WITH
A HAMMER



OLD TIN CANS

Old Tin Cans ! If you look around your home you will be surprised at the number of tin cans to be found there. Most of them finally reach the dustbin, but a few are retained for storing things. Those that are thrown out might be turned to useful account, for quite a number of toys and useful articles can be made from them

Tin cans are really made of sheet iron coated on both sides with a thin layer of tin. Start right away and collect some cans, and let us see what we can make with them. The first job is to make them clean, and we must do this so that the tin is not scraped away or the exposed sheet iron will rust. The best method is to boil the tins in a bucket of strong soda water. This removes all the paper coverings, the dirt and the grease. Now rinse and drain them and they will be ready for use.

If you want to become a good tinker of old tin cans there are certain things that you must learn to do correctly, for they come over and over again in the making of different articles. The first thing is the opening up of a tin in order to get your material. Let us suppose that you have a round coffee tin, and that you want the bottom of the tin for one purpose, and the side for something else.

Mark a pencil line round the tin parallel to the bottom. If you look at the sketch you will see an easy way to do this. Now look for the seam down the side of the tin, and with the snips cut down either side of it to about half an inch from the pencil line. Bend the strip out and snip it off. Now hold the can towards you in your left hand and cut round from *right* to left just above your line. The edge may be rather jagged, but you can trim this up afterwards. The next thing to do is to flatten out the side piece of the can into a nice smooth sheet. Do this with the mallet on the flat iron anvil. Finally the bottom piece needs to be trued up. Hold it in your left hand just as you held the tin. This time you cut very slowly along the pencil line from right to left and finish off with a smooth edge. If you proceed in the same way with other tins you will soon have a good stock of material for future use.

Here are a few tips about working with tin plate. First, always use a mallet. A hammer damages and dents the tinned surface. Never rub the tinned surfaces with a file or emery cloth because by so doing you will remove the tinning and expose the iron.

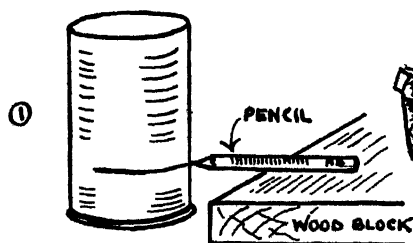
Much of the bending into circular shapes can be done by hand, but in all cases do it very gently to get a regular curve and no creases.

OLD TIN CANS

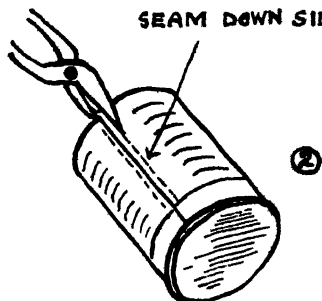
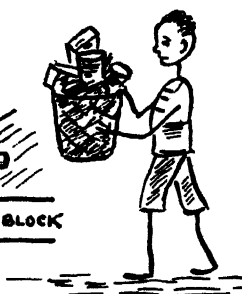
OPENING UP A TIN

ANY OLD CANS

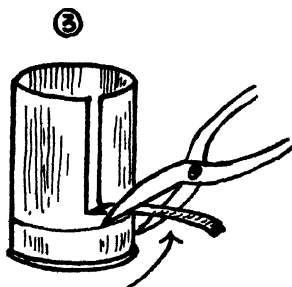
SEAM DOWN SIDE



MARKING A LINE
PARALLEL TO BOTTOM



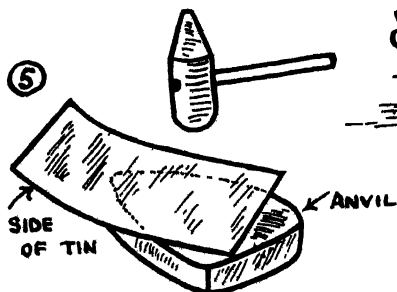
CUT DOWN ON BOTH
SIDES OF SEAM



BEND OUT AND SNIP OFF



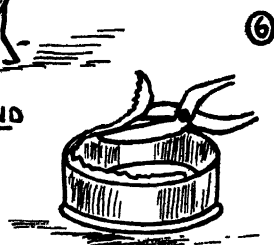
CUT ROUND JUST ABOVE LINE



FLATTEN OUT THE SIDE



POTS TO MEND



TRIM UP THE BOTTOM

PASTRY CUTTERS

Now we ought to be able to make something useful for the home. Ask mother if she would like a nice strong set of pastry cutters.

This gives you the chance to use the bottom of the coffee tin that you so carefully cut out in the previous exercise. In cutting round the line with the snips the tin may get bent a little out of shape. To make it nice and circular again it needs gentle tapping with the mallet on a round anvil. From your store of odd pieces of iron piping, choose a suitable piece to form an anvil and fix it in the vice. Put the edge of the tin on the anvil and tap it into shape as you move it round.

If it is necessary to smooth up the cutting edge of the tin, tack a piece of emery paper on a flat piece of wood as shown, and rub the edge of your tin round and round on the emery paper until quite smooth. Don't use a file, and don't scrape away any of the tinned surface.

Next you need two holes in the lid so that the air can escape from under it when the cutter is pressed on the pastry. This gives you a chance to use a punch. Place the lid over the grain end of a piece of wood fixed in the vice. Put the punch in position and tap several times. This cuts a clean hole and forces the piece of cut tin into the wood.

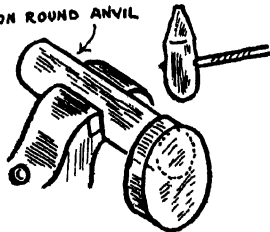
The cutter is now ready for the handle. Mark and cut off from a flat piece of tin a rectangular strip about one-and-a-half inches wide and one inch longer than the circumference of the cutter (*see sketch*). Mark two lines along each edge of the strip a quarter of an inch wide, and allow half-inch tabs at the end. Cut out the strip with the snips. To remove the sharp edge from the handle, sandwich the strip of tin between two blocks of wood, and gently tap the quarter-inch laps over. Finish off by using a steel ruler as shown on the page of home-made tools. Next bend the end tabs inwards until nearly at right angles, and lastly make the handle semi-circular in shape by bending it carefully over a piece of iron piping.

Place the handle in position on the cutter and adjust the tabs so that they lie flat and you are ready for soldering. Spread a little flux along the edges, and lay a snippet of solder in position. Get the soldering iron nice and hot, hold the handle firm and run the solder in a smooth even flow along the edges. Hold the handle firmly until the solder goes dull and sets hard.

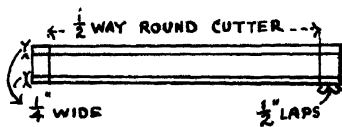
Now that you have really made a useful article, you will probably be keen to do something else.

MAKING A PASTRY CUTTER

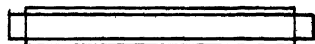
TAP EDGE SMOOTH
ON ROUND ANVIL



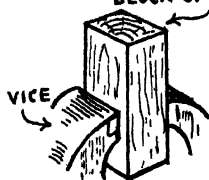
MARK OUT THE HANDLE



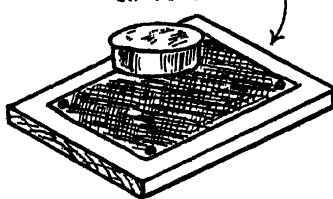
CUT OUT



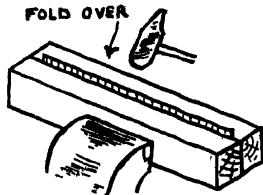
GRAIN END OF
BLOCK OF WOOD



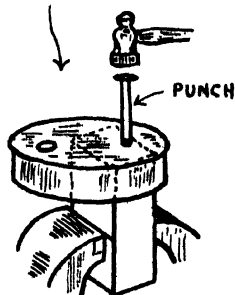
EMERY CLOTH PINNED
ON FLAT BOARD



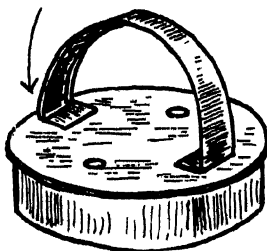
FOLD OVER



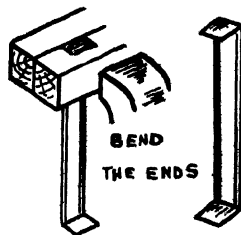
CUT TWO HOLES
IN LID OF CUTTER



SOLDER CAREFULLY



EDGES FOLDED



WHO LIKES MINCE PIES?



CUTTER



READY FOR HANDLE

END OF ANVIL



BEND THE HANDLE

USING TIN CANS

If you have been industrious you should have collected, by now, a good stock of tin cans—large, small, round, oblong and square.

Now look at the sketches on the opposite page and you will find a few simple ideas that can be carried out without difficulty, and it is possible that many other useful things to make will occur to you.

Before starting on a new job it is a good idea to proceed like all good builders, by first drawing a plan of your work on paper. This will help you to use the material to the best advantage, and to make sure that when the tin is cut and folded it will go just where you intended it to. The plan may also prevent you from cutting off something that you intended to stay on. In some of the sketches we have shown a plan of the article to assist you. Be very accurate in taking measurements or the work will be lopsided and not fit together properly.

A *Scoop* for flour or sugar is shown in the first sketch. Choose a suitable tin for the scoop and cut down the seam with the snips. Now instead of cutting round the tin level with the bottom you cut at an angle. The handle is next made and soldered on in the same way as in making the pastry cutter.

The *Ash Tray* and holder for pipe-lighters needs little explanation. It is just a tall narrow tin soldered to a strong lid. There is no need to stick to round tins, and you may think of a much more artistic design than the one shown.

A *Candle Holder*. An oblong tin can be made into a holder for a candle which will come in useful for the garden shed or coal cellar. Another idea is to use an oblong tin for making a miniature dog kennel.

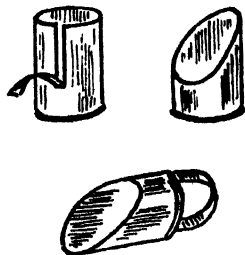
The *Matchbox Stand* introduces a small oblong platform soldered to the centre lid. When the matchbox is slightly open it should fit over the platform securely.

A *Model Punt* is quite easy to make. The plan shows the layout. If you solder the joins carefully it will be water-tight and provide lots of fun down on the pond.

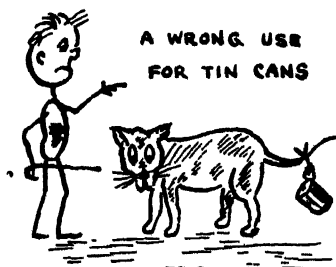
The *Dustpan* or crumb tray gives you a choice of handles. The simplest form is just a bend of tin soldered on the top and bottom. Lap the sides before you solder, to avoid sharp edges. If you give the models a coat of cellulose paint or enamel you will be surprised what a pleasing finish it gives them.

USING TIN CANS

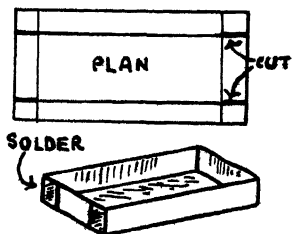
SCOOP



A WRONG USE
FOR TIN CANS

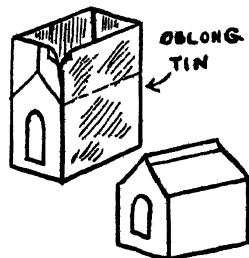
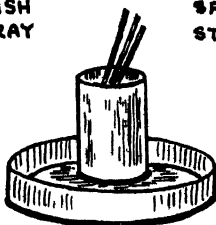
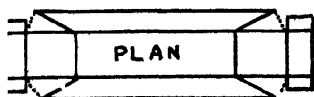


OBLONG TRAY



ASH
TRAY

SPILL
STAND

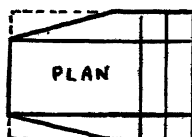
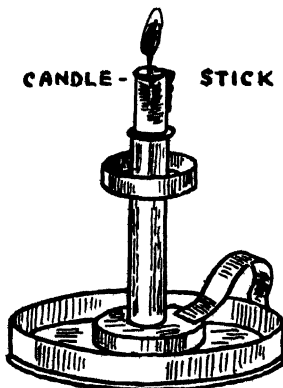


TOY DOG KENNEL

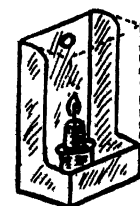
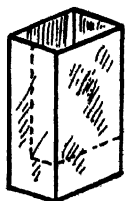


PUNT

CANDLE - STICK



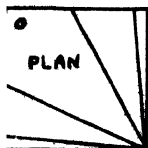
OBLONG
TIN



FOR THE
SHED



DUST PAN

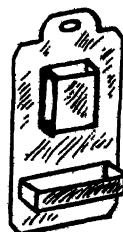
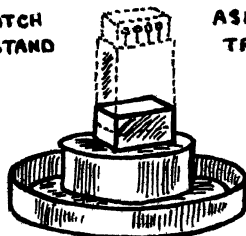


WALL
TIDY



MATCH
STAND

ASH
TRAY



MATCH
BOX
HOLDER

WHEELS AND CYLINDERS

THE usual questions that children ask about a new toy are "Does it work?" or "Will it go?" Therefore if you are thinking of making some toy models the question of wheels and cylinders will be your first concern

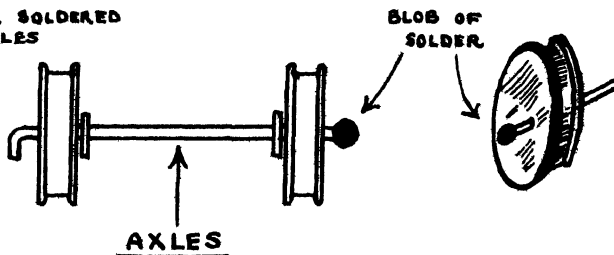
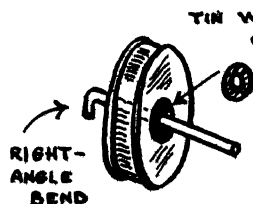
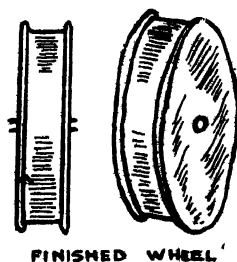
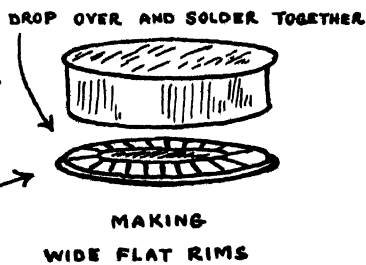
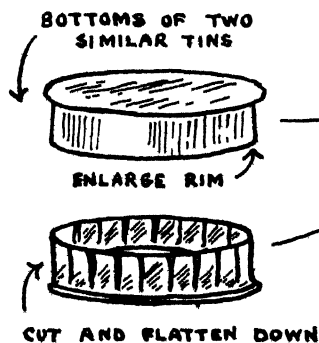
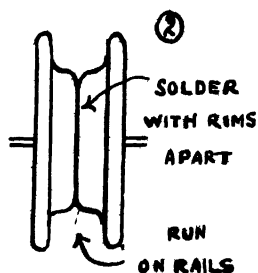
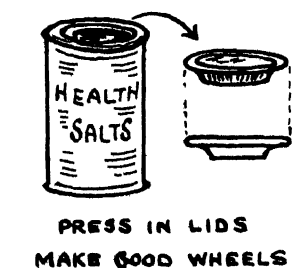
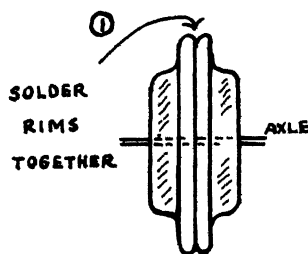
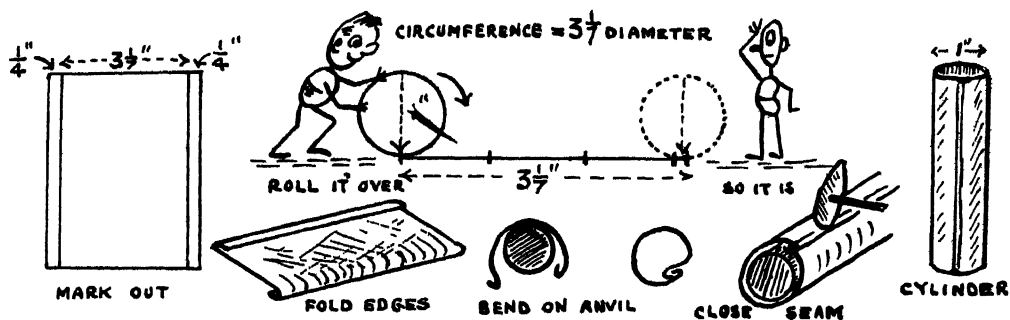
Cylinders. Let us make a tube or cylinder first. If you turn back to page 105 you will get the idea, but it will be well to go over the method again. One thing to remember is that the distance round a cylinder is a little more than three times the diameter. Suppose we are going to make a cylinder one inch in diameter. The width of our tin must be just over three inches plus two quarter-inch pieces for the folds. Look at the sketch and mark out your tin. Now bend one fold up and the other down. Next roll the tin on a round anvil, lock one fold into the other, gently close the seam with the mallet, and there you are. Easy, isn't it?

Wheels. You can make several kinds of wheels from tin cans. Some toffee tins and many tins that come from the chemist's or grocer's have press-in lids. Two of these lids soldered together make very strong wheels. Remember to punch the holes for the axle in the centre of the lids. The press-in lids may be soldered in two ways. By the first method the two rims are soldered together; in the second method the rims are apart when soldered. These latter wheels will run on rails. Shoe-polish tins make grand wheels and they only need soldering together. A wide flat rim is more difficult to make, but it is worth trying. You will need to cut off the bottoms of two similar tins. Next cut the sides of one tin down in small snips and tap the cut strips in with a hammer. Now gently hammer the edge of the other tin on a round anvil to enlarge it slightly. It will then drop easily over the other tin and the join may be soldered. The sketches will give you the idea.

Axles. Good stout galvanised wire, meat skewers, or knitting needles make good axles. In fitting the wheels on the axle, to prevent them from wobbling or slipping out of position it is a good idea to solder a little washer of tin on to the axle just behind the wheel. When the wheels are in position a blob of solder on the end of the axle or a short right-angle bend prevents the wheel from coming off.

Now you can go ahead and make all kinds of things that go on wheels. If you have some odd pieces of Meccano you can introduce them into some of the models with good effect.

WHEELS AND CYLINDERS



RIVETING

It is surprising how many different articles in the house, or tools for the garden, only require a rivet to put them into working order. Here, then, is another chance to make yourself useful. Riveting provides a variation from soldering, and an opportunity to work with heavier metals.

You will find plenty of scope for your ingenuity in construction by using rivets. The best rivets for your purpose are made of copper, and the common shapes are shown in the sketch.

To fix a rivet, first drill the right size hole through *both pieces* of metal which are to be held together. If the metals are thick enough you countersink one piece of metal so that a countersunk rivet fits flush with the surface of the work. If the metals are thin, then a flat-headed rivet is best. The metal of rivets is soft and will spread out when hammered. Place the work on a vice or anvil and hammer out the rivet with perpendicular blows, using the round head of the hammer. Finish off the riveting with the hammer in a slanting position until you have made a secure and rounded head to the rivet. Practise with some odd pieces of metal, and when you have mastered the art start on your first article.

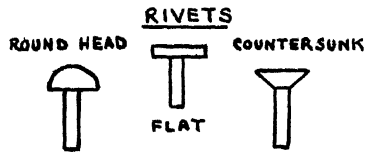
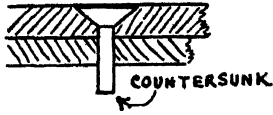
You may have a large tin can or a bucket that needs a handle. Why not make this your first job? You will require a stout piece of galvanised wire for the handle and two pieces of strip metal. Cut the pieces of strip metal the right size and bend them in halves. Then drill three holes for the rivets as shown. Now bend the handle into a semi-circle over a round anvil, and with the pliers bend about one-and-a-half inches out straight at each end. Place the strips of metal in position on the can and mark the places for the holes carefully. Now drill two holes on either side of the can. Next put the can on an anvil, put the strips in position and fix the rivets.

Finally, put the straight ends of the handle through the top holes, bend the ends up with round-nosed pliers and the job is finished.

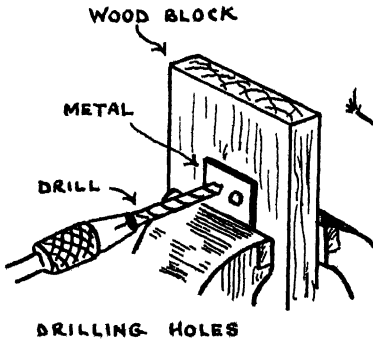
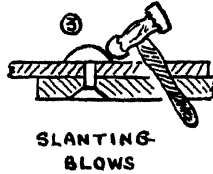
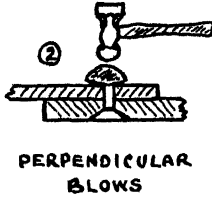
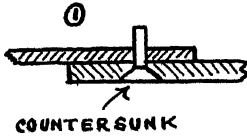
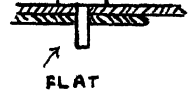
You may find that Dad's garden trowel needs a rivet, and probably the handle of Mother's dustpan needs one also.

RIVETING

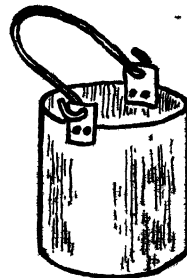
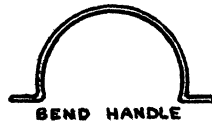
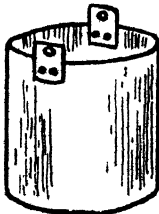
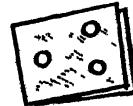
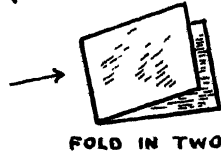
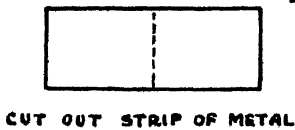
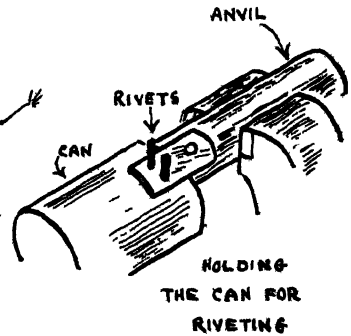
FOR THICK METAL



FOR THIN METAL



JACK AND JILL



AN ELECTRIC LANTERN

A STRONG box, such as a tea chest or one that has contained tinned fruits, is often bound along its edges with strips of metal. If you remove these strips and hammer them out carefully they will provide excellent material for making things.

Let us use some strips of this metal for designing an antique lantern for the front porch. Choose a glass jam jar in which you can suspend an electric bulb and build the lantern around it to whatever design you fancy. The lantern might be square, hexagonal or round, but if you have never made one before, you will be wise to make a square one first.

The sketches will help you in its construction, though they should not prevent you from introducing a few ideas of your own.

Use soft iron rivets about one-eighth-inch diameter for this job. If you have some old meccano parts you may find a use for the nuts and bolts and other odd material. Cut out the pattern first in thin cardboard and then use it for marking out your metal. When fixing the bulb, tie the flex around the handle before putting the lamp and holder into the lantern; this will keep everything in position and add to its security.

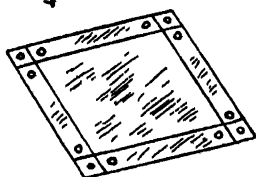
First set out the bottom of the lantern and fold up the edges as shown, but make sure that it just holds the jam jar securely. Now you require four corner pieces and eight cross pieces. Make the corner pieces the same height as the jar and fold each to a right angle. Drilling the holes in the strips of metal is the next job. Do this carefully, otherwise your rivets or bolts will not fit properly. Now you are ready to start riveting the strips together or fixing them with nuts and bolts.

This is the way to make the *top* of the lantern. Set your compasses to the slant height AB and draw a circle on your metal. Now set the compass to the distance BC, which should be a little more than the edge of the bottom. Step this distance four times round the circle, join up the points and add a lap and holes for rivets. Next drill a hole in the centre for the flex, and then cut out, bend and rivet.

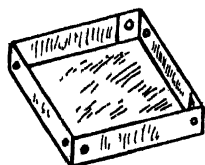
When you have finished the top, cut and fold four small brackets for fixing the top to the base. Solder the brackets inside the top, as shown in the sketch, and then bolt them to the four sides of the lantern. Should the lamp need attention you can easily undo the nuts and remove the top. Finally, bend a strip of metal into a nice shaped handle and bolt or rivet it to the top. Don't forget that success depends on accurate setting out and careful drilling of the holes.

MAKING A SQUARE LANTERN

BOTTOM

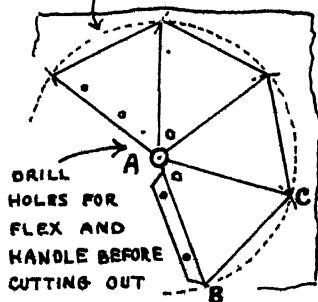


SET OUT
DRILL HOLES
CUT OUT

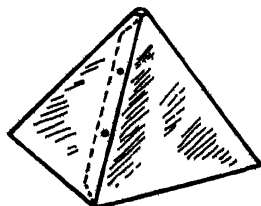


FOLDED UP

TOP SET OUT

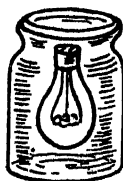


DRILL
HOLES FOR
FLEX AND
HANDLE BEFORE
CUTTING OUT

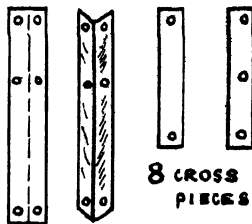


FOLDED AND RIVETED

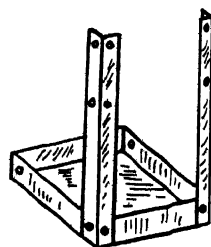
GLASS JAM JAR
AND ELECTRIC BULB



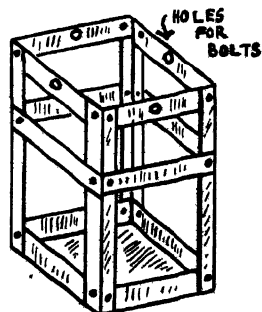
4 CORNER PIECES



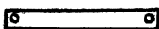
8 CROSS
PIECES



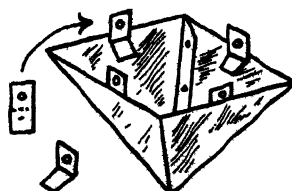
FIX CORNER PIECES



HOLES
FOR
BOLTS



BEND HANDLE



FIX BRACKETS

TIN CAN TOYS

Now show what you can do at tin toy-making. If you have worked steadily through the previous pages you have probably become a good metalworker, and really good at soldering.

Now look over your assortment of tins and the different shapes will suggest what you can make with them. A round tin will do for the boiler of an engine, or the container for an oil tank. An oblong tin is just what you want for a coal waggon or the bonnet of a motor car. The metal tops of ginger beer bottles suggest buffers for engines or head-lamps for cars.

The rest of this book could be filled easily with models that you could make, but as there are other things to talk about we shall have to be content with a page of suggestions and leave you to work out new ideas for other toys.

Most of the toys will require a flat base (bed, chassis or platform) on which to fix the wheels. This can be done simply, in certain cases, by choosing a suitable lid from an oblong box. All you have to do is to drill holes along the sides to take the axles. If you prefer to make a base out of a flat piece of tin you can make it to any size you want, and at the same time introduce drop pieces as imitation springs for the axles. The sketches show you the layout for this.

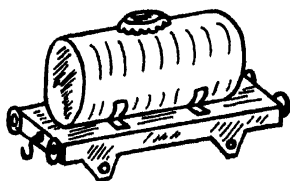
On page 116 we dealt with the making of wheels and axles, but there is one thing you must be careful to note if you are going to use wheels that vary in size. The axles of the smaller wheels will have to be fixed *lower down* than the axles of the larger wheels, otherwise all the wheels will not touch the floor or the rails at the same time. If you look at the dotted lines along the side of the engine you will understand what we mean. The axle of each wheel is placed so that it will be exactly the radius of the wheel from the rails.

In your collection of tins you might find suitable shapes for an engine, a motor car, a lorry, an ambulance waggon, an oil tank, or a coal waggon. The sketches will help you in choosing the right shapes. The bonnet of a motor car can be made quite realistic if you punch lines of small holes in front for the radiator. Whilst an old chisel can be used for cutting slots along the sides for air vents. Don't forget to do this slotting on a block of wood fixed in your vice, as shown in the sketch.

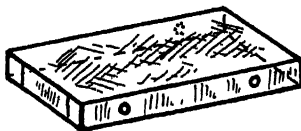
When the model is finished give it a coat of cellulose paint, and you will be surprised to see what a difference this makes to your work.

TIN CAN TOYS

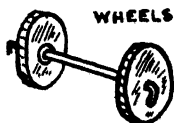
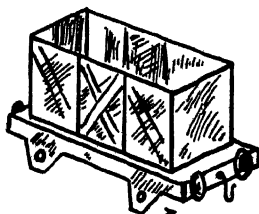
OIL TANK



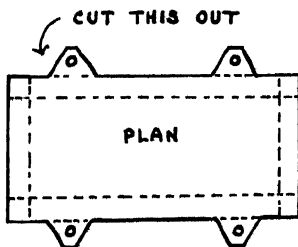
LID OF OBLONG BOX
FOR BED OR CHASSIS



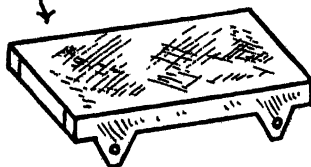
COAL TRUCK



WHEELS



BEND AND SOLDER

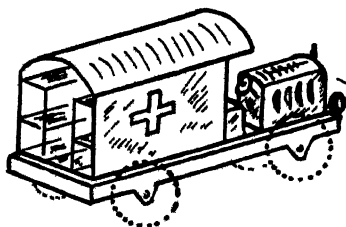


CARPET
TACKS
FOR
BUFFERS

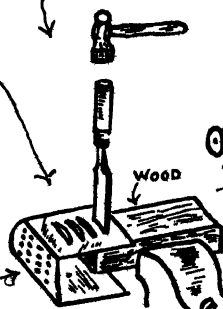
PICK OUT THE ONES
YOU WANT



AMBULANCE CAR

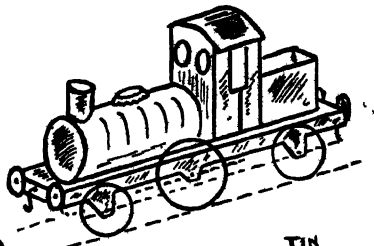


USE OLD CHISEL



PUNCH HOLES FOR
RADIATOR

ENGINE



CUT SLOTS FOR
AIR VENTS



THE ELECTRIC BELL

It is very annoying when the electric bell goes wrong, as it occasionally does in many homes. Why not learn how to put the bell right and earn the thanks of your family.

First study the circuit to make sure that you know how it should work. Next go over each of the parts in turn and see that they function correctly.

Let us start with the *battery*. Disconnect it and test it with an electric bulb from a torch. If it is a dry battery and the light does not come on you need a new battery. A wet battery (Leclanché) may need a new zinc rod or a fresh solution of sal ammoniac. Wash it out, refill it with water and dissolve about two ounces of sal ammoniac in it. Finally clean up the terminals and re-connect. The porous pot is not likely to go wrong.

Now look at the *bell push*. Unscrew the cover. Make sure that the loose contact is nice and springy. Clean the contact surfaces with smooth emery paper, and see that the wire connections are tight before replacing the cover.

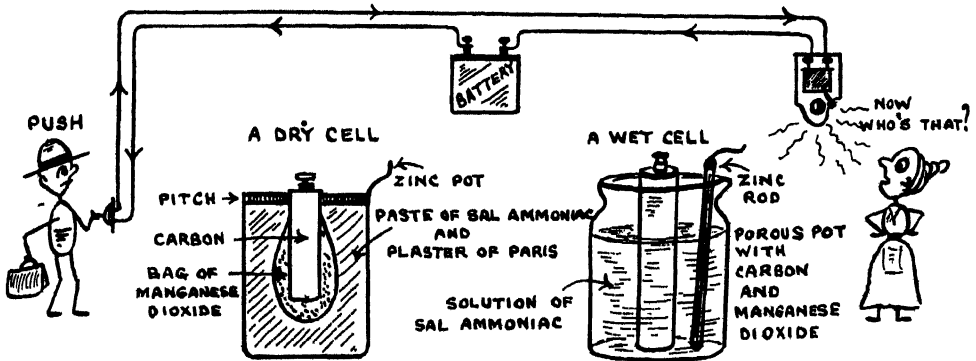
Next we come to the *bell*. Take the cover box off and examine the inside. First make sure that the springy arm touches the adjusting screw. Then take a piece of smooth emery paper and rub it between the arm and screw to get a clean contact. Next push the clapper over to the gong and notice if the springy arm pulls away from the adjusting screw. If it still makes contact, turn the screw until there is a little gap between screw and spring arm when the clapper touches the gong.

Now see if the wires on the bobbins are sound and that the connecting wires to the terminals are secure. Finally connect the battery direct to the terminal screws and the bell should ring. Battery, bell push, and bell now being in order the bell should ring when you press the bell push. If it does not ring the trouble is in the connecting wires. You will have to examine them bit by bit until you come to a break.

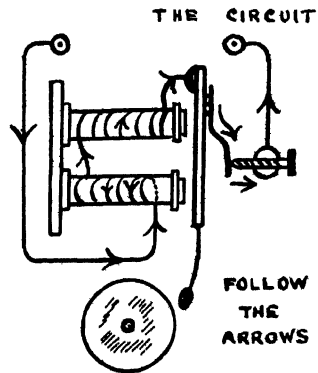
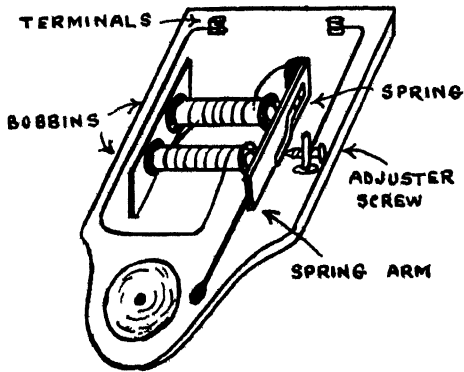
Now that you understand how electric bells work perhaps you will try to fit up a bell for the back door, the front door, or in any other place where it might be useful. Remember to fix *the bell* in the room where you want to hear it. Do you think you could manage to put in wires for a second bell push on the same circuit? Draw a sketch to show the way you would do it.

MAKING THE BELL WORK

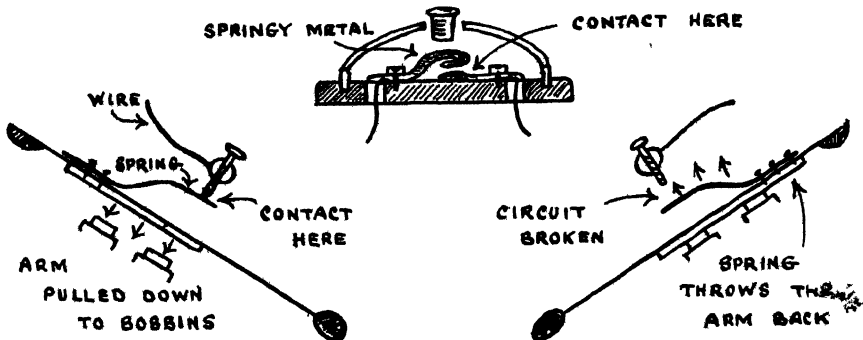
THE CIRCUIT



THE BELL



BELL PUSH



MORSE CODE TELEGRAPH

THE Morse code telegraph is very interesting, and it does not require a great deal of skill to make a good Morse instrument. It consists of a tapping key, a receiver, a battery, and connecting wires. Look at the sketches and you will see how the parts are connected up. Let us make one

Start with the *Receiver* Cut out a piece of thin sheet iron as shown in the sketch A, drill two holes for a wire pivot and bend the tabs down. Notice that the end A is the longer so that when the bar is mounted it will fall on to the "rest" made by the lower tabs on B. The tab at the top of B stops the bar when it swings upward. The support C and the end piece B may be made of sheet tin or brass and then mounted with screws on a wood base

If you decide to make the *Electro-magnet* yourself, first wind very many turns of No. 28 cotton or silk-covered wire on a bobbin just as cotton is wound on a reel. The centre core of the bobbin is packed tightly with equal lengths of soft iron wire. An easier method is to use the bobbins from an old electric bell. When an electric current passes through the wire on the bobbin the iron core becomes a temporary magnet and attracts the iron bar to it. When the current is switched off the core loses its magnetism and the bar drops back to "rest."

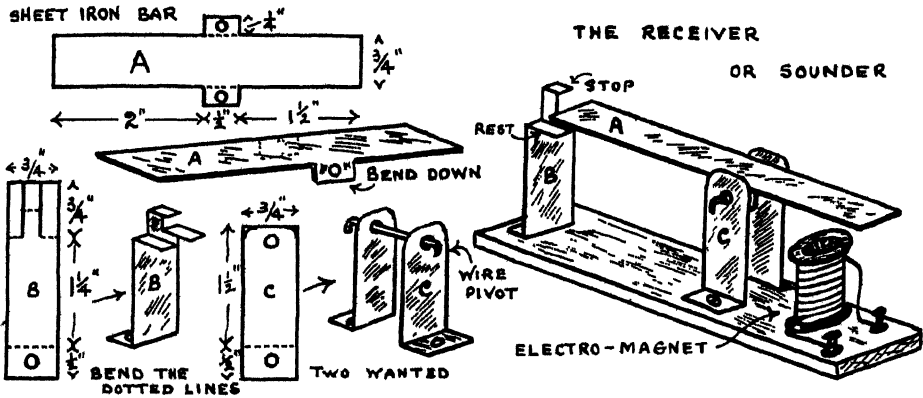
Cut a piece of nice springy sheet brass for the tapping key. Drill a hole at one end and bend it as shown. Now screw it down to a base board so that it can be tapped down to make contact with a round-headed brass screw. Fix two terminals and connect the screw and the strip of brass with wires as shown.

The mounting of the electro-magnet requires special attention. Hold the bar A up so that it touches the stop on B. The other end of the bar should now *almost* touch the core of the magnet. If it does not, then either raise the magnet with packing underneath it, or bend the iron bar down a little towards the magnet

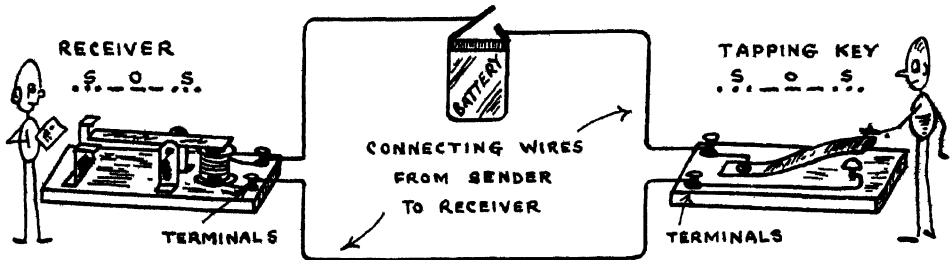
When you have made this adjustment, connect up with the battery and make sure that it pulls the iron bar down when you switch on.

Now we are ready to wire up the set. When everything is correct tap down the key. The iron bar will be pulled down to the magnet and the other end A will hit the stop B with a click.

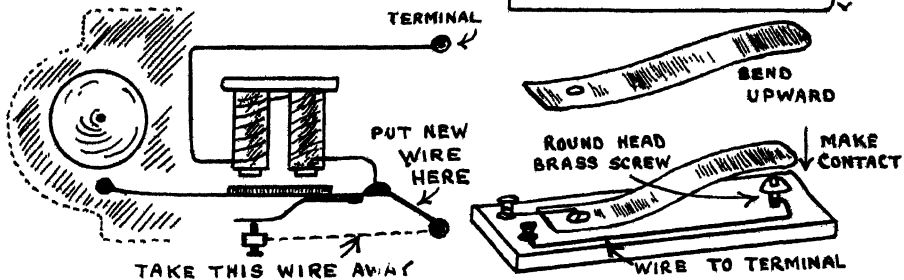
MORSE CODE TELEGRAPH



HOW TO CONNECT UP



CAN USE AN ELECTRIC BELL FOR A RECEIVER IF YOU CHANGE ONE OF THE WIRES



MORSE CODE

Now you and your friend will have to learn the Morse code and send messages to one another. Of course, you take turns in tapping and receiving.

If you can get an old electric bell you can turn it into a receiver, by making a slight alteration in the wiring. All you have to do is to take away the wire that joins the bobbins to the springy arm and connect them straight to the battery as shown in the sketch. The bell will then ring when you tap the key.

THE MORSE CODE consists of dots and dashes. Each word of a message is tapped out letter by letter with a slight pause for the end of a word and the stop sign . — . — . for the end of a message. Frequent practice will quicken your rate until you can easily send out an eight word message per minute.

The Morse Alphabet arranged for easy memorizing. Read *across* the page.

E one dot, I two dots, etc.

T one dash; M two dashes, etc.

A 1 dot 1 dash, N 1 dash 1 dot, and so on.

E .	I . .	S	H
T —	M — —	O — — —	
A . —	N — .		
U . . —	D — . .	R . — .	
V . . . —	B — . . .	L . — . .	F . . — .
W . — —	G — — .	K — . —	
Z — — . .	C — . . .	P . — — .	X — . . —
J . — — —	Y — . — —	Q — — . .	

Numerals

1 . — — — —	2 . . — — —	3 . . . — —
4 —	5	6 —
7 — — . . .	8 — — — . .	9 — — — — .
0 — — — — —		

Code Calls

Calling up (VE) . . . — . (repeat)

Erase eight dots

Full Stop (A A A) . — . — . —

End of Message (AR) . — . — .

